

4.0 AFFECTED ENVIRONMENT

The proposed action would occur at Fort Detrick, in Area B. Fort Detrick is located in the northwest portion of the City of Frederick, in Frederick County, Maryland. The proposed action consists of six projects that would occupy approximately 150 acres on Area B. Area B consists of approximately 399 acres that is currently used for agricultural research, animal grazing, animal maintenance, training for the Army Reserve, antenna facilities, and the Fort Detrick sanitary landfill. The location of the six projects being considered under the proposed action is shown in Figure 2-2.

4.1 GEOLOGY, TOPOGRAPHY, AND SOILS

4.1.1 Geology

Fort Detrick is located in the western part of the Piedmont Physiographic Province, which is characterized by rolling terrain and rather deeply incised stream valleys. The Piedmont, which comprises approximately 29 percent of Maryland, extends from its Fall Line boundary with the Coastal Plain Physiographic Province in the east, to the Catoctin Mountains of the Blue Ridge Physiographic Province in the west, and consists primarily of hard, crystalline igneous and metamorphic rocks.

Fort Detrick is located in the Frederick Valley, which is a geological subdivision of the Piedmont Physiographic Province. The Frederick Valley is a broad overturned synclinorium that extends from the Potomac River to the south for approximately 26 miles where it is overlapped by Triassic rocks to the north of Fort Detrick. The Valley is approximately six miles wide with its western boundary near to the western edge of the Piedmont Province and its eastern boundary placed at the contact between limestones of the Frederick Valley and sandstones and siltstones of the Araby Formation.

Rock formations of the Frederick Valley consist of Triassic limestone and dolomitic conglomerates, sandstones, siltstones, mudstones, and shales; Ordovician dolomite and limestone; and Cambrian limestones (Figure 4-1). The west central and northwestern sections of Area B are underlain by Triassic shales of the New Oxford Formation; the east central and northeastern sections are underlain by conglomerates of the New Oxford Formation; the central eastern boundary is underlain by Ordovician dolomite and limestone of the Grove Formation; and the west, south, and central northeast sections are underlain by Upper Cambrian limestones of the Frederick Formation.

The Rocky Springs Station Member of the Frederick Formation occurs in the south central section of Area B and is characterized by very thinly bedded limestone interbedded with black calcareous shale, sandy limestone, flaggy limestones and very thick, to massively bedded limestone breccia. Quaternary mountain wash deposits consisting of poorly sorted, angular colluvium and alluvium occur as surface deposits in the central, west, and southwest sections of Area B.

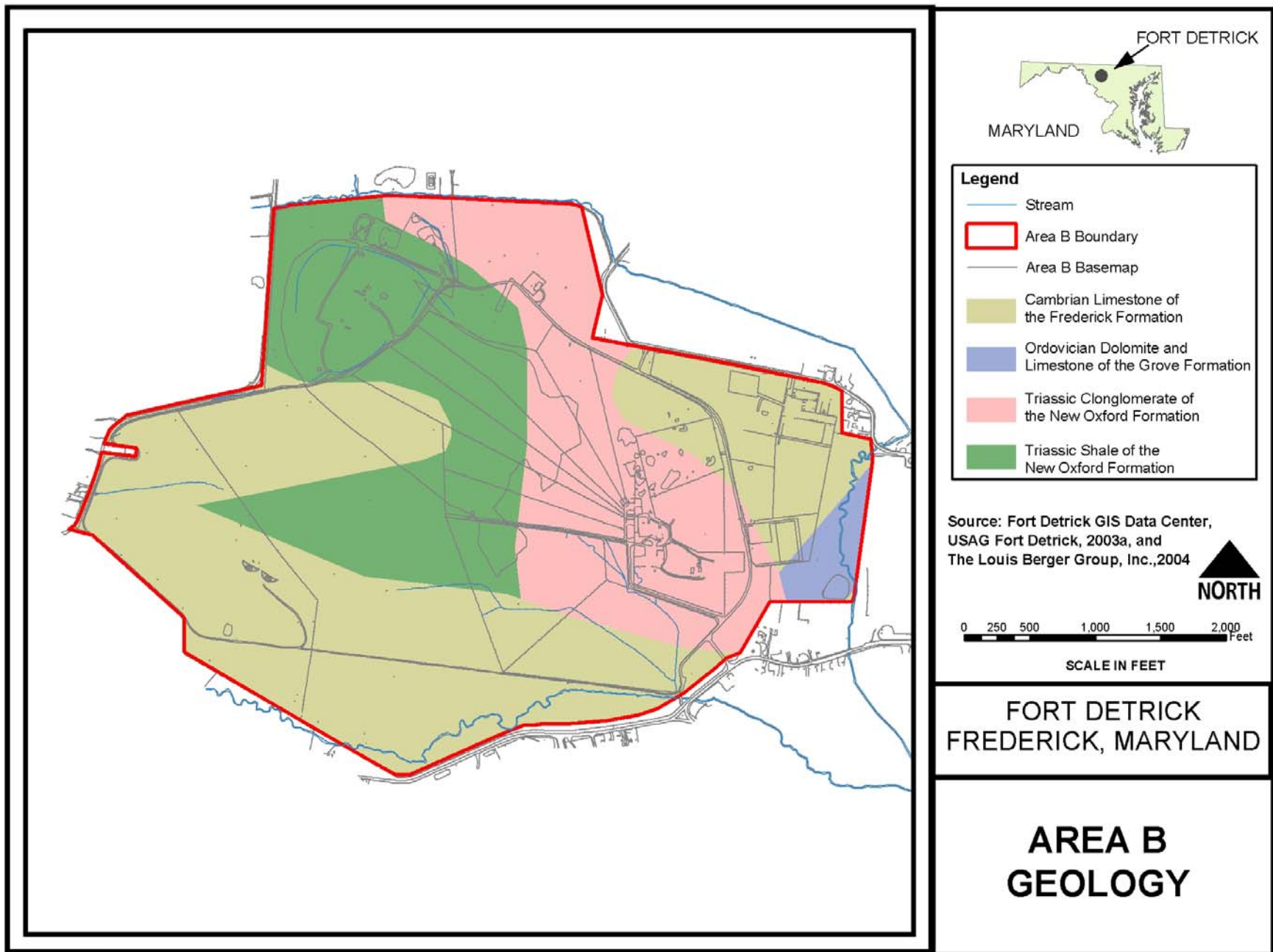


FIGURE 4-1 – AREA B GEOLOGY

The Triassic New Oxford Formation unconformably overlies the Upper Cambrian Frederick Limestones on the property. Triassic sediments were deposited over Upper Cambrian Limestones following down-faulting that occurred along the boundary of the Piedmont and Blue Ridge Physiographic Provinces during the Triassic.

The beds of Triassic rocks occurring in Area B dip an average of 20 degrees to the northwest. A northwest to southeast trending fault also occurs across the southern quarter of Area B approximately along the contact between the Upper Cambrian and Triassic Formations.

4.1.2 Sinkholes and Enclosed Depressions

Sinkholes and enclosed depressions are surface features associated with karst terrain, which is found throughout Fort Detrick. Karst terrain is comprised of landform features with distinctive characteristics of relief and drainage that developed primarily from the solution of soluble bedrock by natural waters. Sinkholes, which are typically characterized on the surface as round depressions, develop when groundwater dissolution of limestone causes the collapse of a subsurface solution cavity. Sinkholes typically have a drain that directs surface runoff to a subsurface drainage area. In some cases groundwater may fill the sinkhole following collapse.

The Frederick Valley represents Maryland's second largest area of karst terrain. Karst features, including sink holes, develop in the Triassic, Ordovician, and Cambrian formations of the Valley. The Rocky Springs Station Member of the Cambrian Frederick Formation and the Ordovician Grove Formation both occur under Area B and have a high potential for sinkhole formation.

The U.S. Army Corps of Engineers (USACOE) prepared a map of sinkhole/depression and fracture trace/lineament features occurring on Areas A and B of Fort Detrick using the U.S. Geological Survey 7.5 minute Frederick, Maryland topographic quadrangle map dated 1988 and aerial photographs of Areas A and B in the Fort Detrick area dated 1937 (i.e., before significant development) (Figure 4-2).

Sinkholes and depression features were identified based on topographic characteristics, vegetation, and soil tone indicators of subcircular depressions. On aerial photographs these features may have light signatures indicating dry conditions in the sinkholes or dark signatures indicating shallow, clay filled sinkholes containing moisture. Natural linear features observed using aerial photographs were identified using topographic characteristics (including straight stream segments), vegetation, or soil tonal alignments, which are continuous for less than one mile. Features that continued for more than a mile were termed lineaments. The linear features on aerial photography are reflective of geological features such as faults, joints, zones of weakness, or bedrock contacts but also may indicate man-made structures such as fence lines, buried pipeline, or drainage ditches. Subterranean fracture traces that are connected to an aquifer may represent pathways for groundwater flow and have the potential to influence the regional groundwater flow regime. The sinkhole/depression and fracture trace/lineament features were verified by a ground-truthing field survey (USAG, Fort Detrick, 2003a).

Based on the photogeologic analysis, three large sinkholes were identified in the southwestern section of Area B. Recent sinkhole development has occurred in this area, with the development

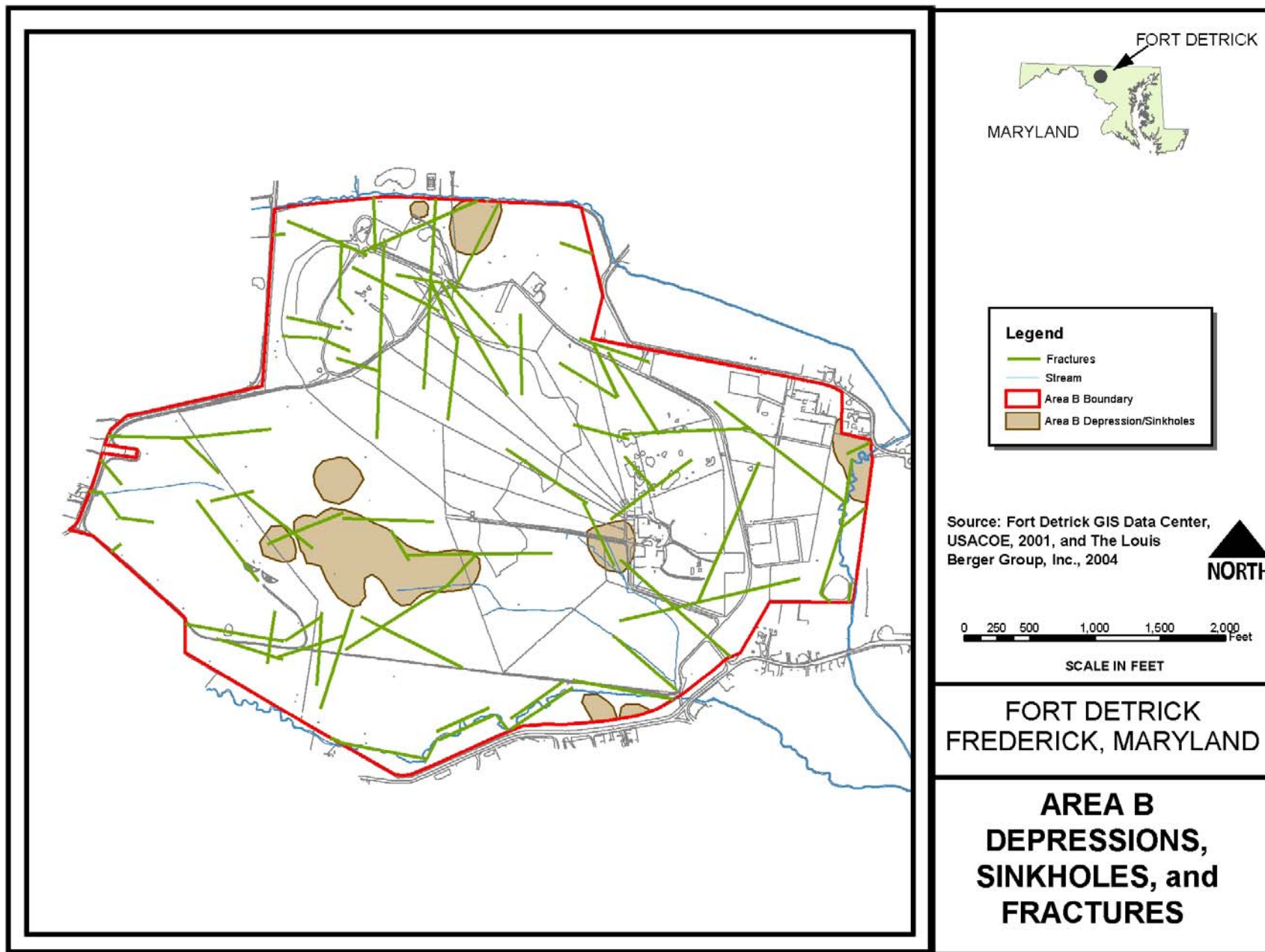


FIGURE 4-2 – AREA B DEPRESSIONS AND SINKHOLES

of a water filled sinkhole since the completion of the photogeologic analysis. A sinkhole was also mapped just to the west of the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) Large Animal Research Facility (LARF); two were mapped along the northern boundary of Area B; two occur adjacent to the unnamed tributary to Carroll Creek that flows along the southern boundary of Area B; and one occurs along the eastern boundary of the site along Carroll Creek.

4.1.3 Topography and Drainage

The topography of Area B is gently rolling with a maximum elevation of approximately 400 feet above mean sea level (amsl) along the western boundary and a minimum elevation of approximately 330 feet amsl in the southeastern corner of the site (Figure 4-3). A broad swale trends northwest to southeast through the central section of Area B. Surface drainage in the central section of Area B flows primarily to the broad swale. Runoff along the southern boundary of the site flows primarily to an unnamed tributary of Carroll Creek that flows along the southern boundary. Surface runoff in the eastern and northeastern section of Area B flows primarily to Carroll Creek (see Section 4.2.1 Surface Water for additional discussion of site drainage).

The topography of Area B has been influenced by solution weathering, which has resulted in the development of a karst terrain. The Frederick and Grove Formations which underlie much of Area B are highly susceptible to solution weathering and the development of associated surface features. Sinkholes, closed depressions, and karst springs are karst features that have been identified on Area B, as discussed in Section 4.1.1 Geology.

4.1.4 Soils and Prime Farmland

Soil characteristics are considered because they can limit or restrict use. Examples of soil characteristics that can limit use include poor drainage, excessive wetness, excessive erodibility, the occurrence of rock at shallow depths, the presence of shrink-swell clays, or the occurrence of prime farmland. Soil characteristics may preclude proposed uses, require the application of special engineering designs, or require coordination with federal and/or state agencies.

Soils

The Soil Survey of Frederick County Maryland (USDA, 2001) shows fourteen soil mapping units occurring on Area B. The following discussion provides general characteristics of the mapping units, their locations on Area B, and general limitations associated with the mapping units (Figure 4-4).

Codorus and Hatboro silt loams, 0 to 3 percent slopes (CgA). The Codorus series consists of very deep, moderately well drained soils that formed in recently deposited alluvium materials from metamorphic and crystalline rocks. The Codorus series occurs on nearly level active flood plains. The Hatboro series consists of very deep, poorly drained soil that developed in alluvial material eroded from micaceous and phyllitic uplands. The Hatboro series occurs on nearly level flood plains. Development in the Codorus and Hatboro silt loams is very limited due to shallow depth to saturation and flooding. The Hatboro series is designated as a hydric soil. The Codorus

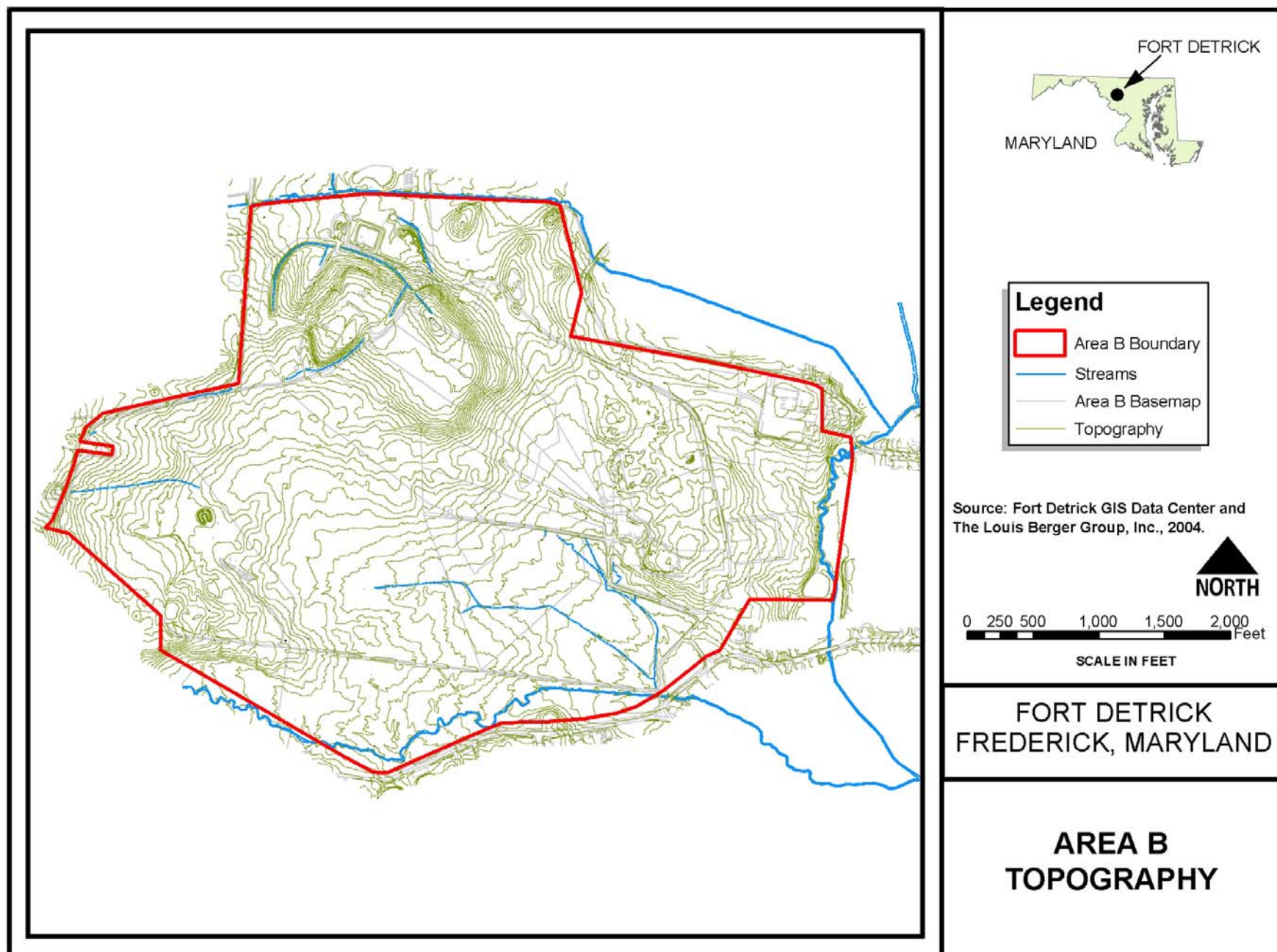


FIGURE 4-3 – AREA B TOPOGRAPHY

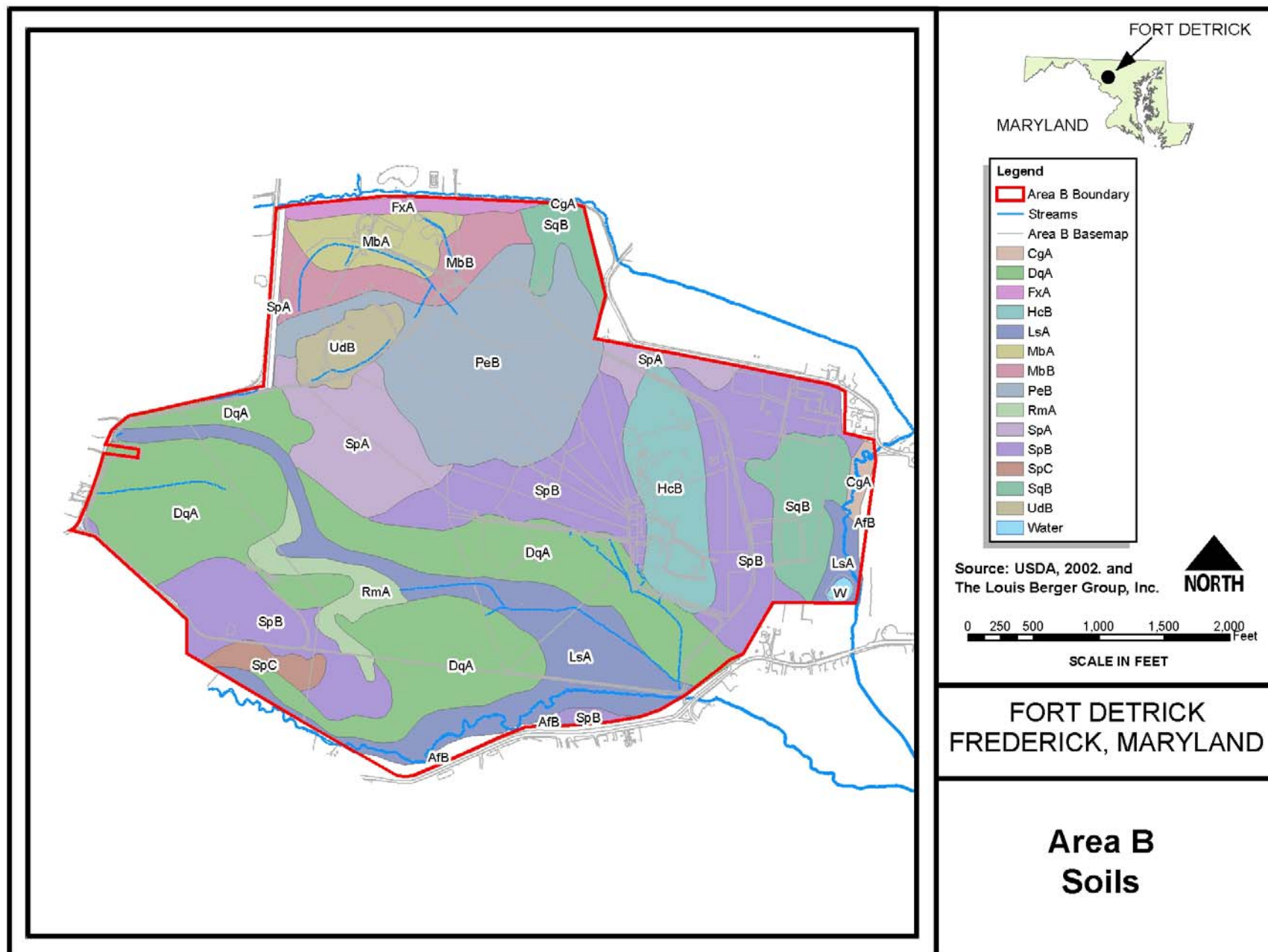


FIGURE 4-4 – AREA B SOILS

and Hatboro silt loams are mapped along a tributary to Carroll Creek along the east central boundary of Area B.

Dryrun gravelly loam, 0 to 3 percent slopes (DqA). The Dryrun gravelly loam is a moderately well drained soil that developed from parent material comprised of limestone, sandstone, and shale. The soil occurs on old alluvial fans in valleys. There is a moderate to high potential for the formation of sinkholes in the Dryrun series. The Dryrun gravelly loam is a dominant soil mapped on the site and occurs at several locations in the southern two thirds of Area B.

Foxville and Hatboro soils, 0 to 3 percent slopes (FxA). The Foxville series is a very deep, somewhat poorly drained soil that developed in alluvium and colluvium derived from mixed greenstone, greenstone schist, quartzite and phyllite. The soils occur on nearly level and gently sloping, high gradient floodplains. The Hatboro series consists of very deep, poorly drained soil that developed in alluvial material eroded from micaceous and phyllitic uplands. The Hatboro series occurs on nearly level flood plains. Development in the Foxville and Hatboro soils is very limited due to shallow depth to saturation, flooding, ponding, and the occurrence of large stones. The Foxville and Hatboro soils are designated as hydric. The mapping unit occurs in a narrow band along the northern boundary of Area B.

Hagerstown-Opequon silty clay loams, 3 to 8 percent slopes, rocky (HcB). The Hagerstown series is a very deep, well drained soil that developed in residuum derived from limestone. The soil occurs on nearly level to moderately steep uplands. The Opequon series is a shallow, well drained soil that formed in residuum weathered from massive limestone. This soil occurs on nearly level to steep uplands. The Hagerstown-Opequon silty clay loams occur on karst landscapes. There is a moderate to very high potential for the development of sinkholes in the mapping unit and active and inactive sinkholes can make up as much as 10 percent of the unit. Development in the mapping unit is also somewhat to very limited due to the occurrence of shrink-swell clays. The Hagerstown-Opequon silty clay loams are mapped in the area around the existing agricultural buildings in Area B.

Lindside silt loam, 0 to 3 percent slopes (LsA). The Lindside series is a very deep, moderately well drained soil that formed in alluvium eroded from limestone uplands. These soils occur on nearly level active flood plains. Development in the Lindside silt loam is very limited due to shallow depth to saturation and flooding. This mapping unit occurs along streams and spring drainages in Area B.

Morven loam, 0 to 3 percent slopes (MbA). The Morven loam is a very deep, well drained soil that developed in colluvium from calcareous conglomerate. The soils occur on nearly level and gently sloping upland swales in saddles at the head of drainageways, and on footslopes. This mapping unit occurs in the northwest corner of Area B.

Morven loam, 3 to 8 percent slopes (MbB). See above for the description of the Morven loam. The soil is mapped in the northwest corner of Area B.

Penn channery loam, 3 to 8 percent slopes (PeB). The Penn series consists of moderately deep, well drained soils that formed in residuum from noncalcareous red shale, siltstone, and fine grained sandstone. This soil occurs on dissected uplands. Development in the Penn channery

loam is somewhat limited due to a shallow depth to hard bedrock. This mapping unit occurs in the north central section of Area B.

Reaville silt loam, 0 to 3 percent slopes (RmA). The Reaville series consists of a moderately deep, somewhat poorly drained soil that formed in residuum from red shale, siltstone and fine grained sandstone. These soils occur on nearly level and gently sloping interfluvies in saddles and swales. Development in the Reaville silt loam is very limited due to a shallow depth to saturation, flooding, and ponding. This mapping unit occurs in a narrow band in association with spring drainages in the southwest section of Area B.

Springwood gravelly loam, 0-3 percent slopes (SpA). Springwood gravelly loam is a very deep, well drained soil that formed in residuum from calcareous conglomerate. The soil occurs on the summits and backslopes of valleys. The Springwood series has a moderate potential for the occurrence of sink holes. The Springwood gravelly loam, 0-3 percent slopes occurs at locations in the west central and northeastern sections of Area B.

Springwood gravelly loam, 3-8 percent slopes (SpB). See above for the description for the Springwood gravelly loam. The 3-8 percent slope phase of the Springwood gravelly loam has a moderate potential for the occurrence of sink holes. The Springwood gravelly loam, 3-8 percent slopes is mapped in an area along the eastern boundary of Area B.

Springwood gravelly loam, 8-15 percent slopes (SpC). See above for the description for the Springwood gravelly loam. The 8-15 percent slope phase of the Springwood gravelly loam has a high potential for the occurrence of sink holes. Slope is also a limitation for development in the 8-15 percent slope phase of the series. The Springwood gravelly loam, 8-15 percent slopes mapping unit is found in a small area along the southwestern boundary of Area B.

Springwood-Rock outcrop complex, 3 to 8 percent slopes (SqB). See above for the description for the Springwood series. The rock outcrop, 3 to 8 percent slope phase of the Springwood series has a high to very high potential for the occurrence of sink holes. The Springwood-Rock outcrop complex, 3 to 8 percent slopes is mapped adjacent to the eastern boundary of Area B.

Udorthents, smooth, 0 to 8 percent slopes (UdB). Areas in this mapping unit are highly disturbed and many of the original soil characteristics have been altered. Cut and fill material may range from 1 to over 20 feet in thickness. Onsite characterization is necessary to determine uses and limitations for this mapping unit. Udorthents are mapped at the landfill in the northwest section of Area B.

Soil Erosion Potential

The soil erosion potential for all soils on Fort Detrick is classified as “slight” (USDA, 1956). The greatest potential for soil erosion is along the creeks in Area B. However, the limited amount of erosion occurring in these areas has generally been corrected by restricting livestock use of the area and establishing good vegetative cover (USAG, 2001).

Prime Farmland

The Dryrun gravelly loam, 0 to 3 percent slopes; Hagerstown-Opequon silty clay loams, 3 to 8 percent slopes, rocky; Lindside silt loam, 0 to 3 percent slopes; Morven loam, 0 to 3 percent slopes; Morven loam, 3 to 8 percent slopes; Springwood gravelly loam, 0-3 percent slopes; and Springwood gravelly loam, 3-8 percent slopes are considered prime farmland soils by the United States Department of Agriculture, Natural Resources Conservation Service that occur on Area B (Figure 4-5). The presence of prime farmland soil is a necessary component of prime farmland and is the primary indicator used to determine where potential prime farmland occurs. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are those needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water.

Prime farmland is protected under the Farmland Protection Policy Act of 1981. The intent of the act is to minimize the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland to nonagricultural uses. The act also ensures that federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The Natural Resources Conservation Service is responsible for overseeing compliance with the Farmland Protection Policy Act and has developed the rules and regulations for implementation of the act (see 7 CFR Part 658, July 5, 1984).

The implementing procedures of the Farmland Protection Policy Act and Natural Resources Conservation Service require federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, as well as farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action is based on preparation of the farmland conversion impact rating form AD-1006 for areas where prime farmland soils occur and by applying criteria established at section 658.5 of the Farmland Protection Policy Act (7CFR658).

Farmland impact rating form AD-1006 has been completed and was sent to the Natural Resources Conservation Service (NRCS), Frederick County Soil Conservation District. Fort Detrick will complete the Prime Farmland evaluation once response from NRCS is received (see Appendix A).

4.2 WATER RESOURCES

Activities being considered for Area B have the potential to affect water resources on and in the vicinity of the site. Water resources that may be affected by the actions being considered for Area B include surface water, groundwater, wetlands, and floodplains. Each topic is discussed below.

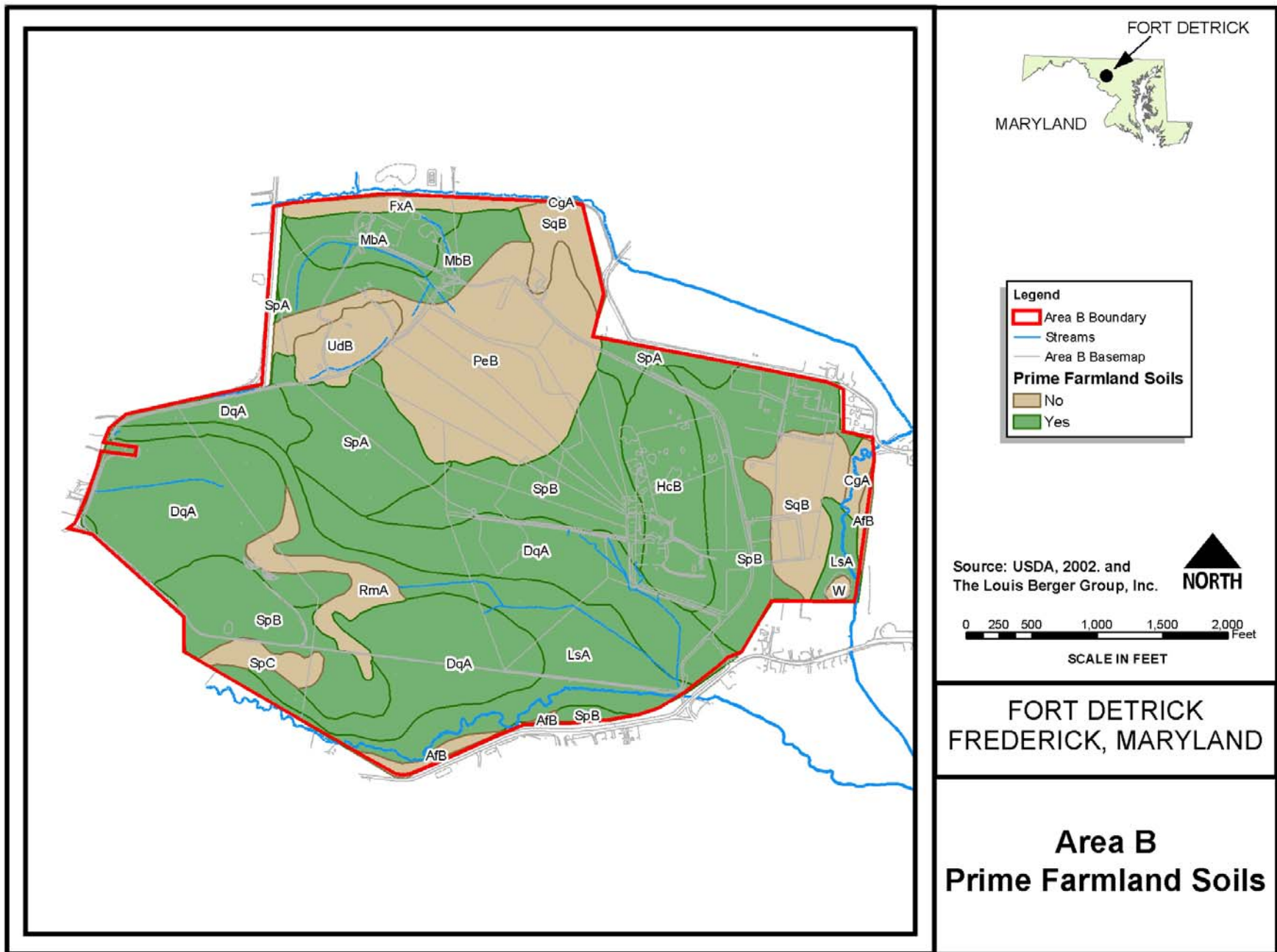


FIGURE 4-5 – AREA B PRIME FARMLAND SOILS

4.2.1 Surface Water

Fort Detrick is located within the Monocacy River drainage basin, a sub-basin of the Middle Potomac River Basin. Approximately 75 percent of the Monocacy River watershed is located in the State of Maryland, with the remainder in Pennsylvania. Land use in the watershed is predominately agricultural (75 percent) with the remaining uses comprised of forests, the City of Frederick, and residential neighborhoods. The Monocacy River flows into the Potomac River 15 miles south of the City of Frederick. The Potomac River discharges into the Chesapeake Bay.

Carroll Creek and its tributaries comprise the primary surface water features occurring in the vicinity of Area B. Carroll Creek flows east and south from its source on Catoctin Mountain, then south along the eastern boundary of Area B. To the south of Area B, Carroll Creek flows southeast and east for approximately 3.5 miles before joining the Monocacy River. Three unnamed tributaries to Carroll Creek also provide drainage to Area B. An unnamed tributary (labeled as UT 1 on Figure 4-6), which flows along the northern boundary of the site, originates near Catoctin Mountain to the west then flows east to its confluence with Carroll Creek near the northeast corner of Area B. A second tributary (labeled as UT 2 on Figure 4-6) originates from two springs located in the central section of Area B, and flows east southeast across the site into the third unnamed tributary (labeled as UT 3 on Figure 4-6) that flows along the southern boundary of Area B. A manmade channel extends to the west of the two springs and directs drainage from the west central section of Area B into drainage from the springs. A small tributary originates from a spring located just to the west of the USAMRIID LARF, then flows southeast and south and joins the unnamed tributary just north of the southeast boundary of Area B. The unnamed tributary that flows along the southern boundary of Area B originates to the west of the site on Catoctin Mountain, then flows southeast and east before joining Carroll Creek approximately 2,000 feet offsite near the southeast corner of Area B. A short spring fed drainage also occurs in the west central section of the site. Flow in the drainage channel originates at a spring located just offsite near the western boundary of Area B. The shallow drainage channel was dug to collect and direct flow from the spring. The channel ends in the west central section of Area B where surface flow discontinues at a sinkhole.

Two ponds occur on Area B. Post Pond encompasses approximately 0.23 acres and is located in the southeastern corner of Area B. The second unnamed pond is located in the west central section of Area B and developed in the last several years as a result of groundwater discharge into a recently formed sinkhole.

The Monocacy River is the water supply source for Fort Detrick. Source water is withdrawn from the Monocacy River and is processed through the Fort Detrick Wastewater Treatment Plant (WWTP), which is located in Area C. The Maryland Department of Environment has authorized Fort Detrick to withdraw water from the Monocacy River at a daily average rate of 2.0 million gallons per day (mgd) with a maximum daily withdrawal of 2.5 mgd under Water Appropriation and Use Permit No. FR43S001(02).(USAG, Fort Detrick, 2003a).

The Monocacy River is a warmwater fishery and is classified by the State of Maryland as Recreational Trout Waters and Public Water Supply (Use IV-P) (Code of Maryland Regulations [COMAR] 26.08.02). Use IV-P waters are managed as special fisheries by periodic stocking and seasonal catching and have the potential for supporting adult trout populations for put-and-take

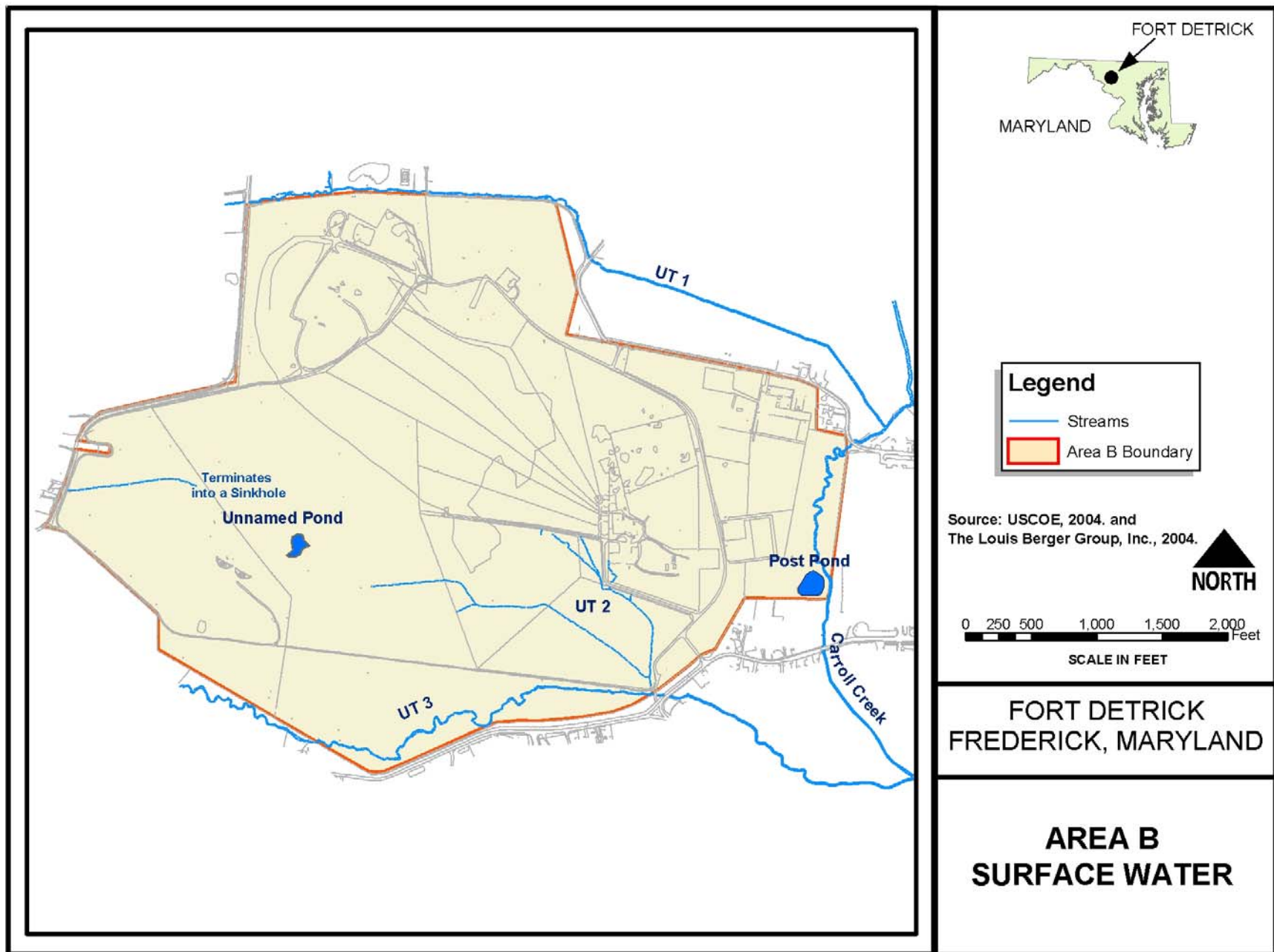


FIGURE 4-6 – AREA B SURFACE WATER

fishing. Tributaries of the Monocacy River that are not designated Use IV-P are designated as Use III-P (Natural Trout Waters and Public Water Supply). These tributaries must maintain water quality standards that ensure the growth and propagation of self-sustaining trout populations and their associated food organisms. Use III-P tributaries must also provide a safe and effective public water supply source. Carroll Creek is classified as Use III-P.

4.2.2 Floodplains

Executive Order (EO) 11988, Floodplain Management, directs federal agencies to avoid, to the extent possible, the long-term and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practical alternative.

Floodplains are described as areas likely to be inundated by a particular flood. For example, a flood that has a one-percent chance of occurring in any one year is the 100-year flood. The 100-year floodplain includes some land areas that are flooded by small and often dry watercourses. A floodplain study was conducted by USACOE on Area B in March 2004. Based on the draft results of the study, a 100-year floodplain occurs along the eastern boundary of Area B in association with Carroll Creek; along the northern boundary in association with an unnamed tributary to Carroll Creek; along the southern boundary in association with an unnamed tributary to Carroll Creek; and in the south central and eastern section of Area B in association with an unnamed tributary to Carroll Creek (Figure 4-7).

4.2.3 Groundwater

Groundwater in the Frederick area occurs in hard rock aquifers associated with the formations of the Frederick Valley subdivision of the Piedmont Physiographic Province. The hard rock aquifers occurring in the area are the most productive aquifers of this type in the State of Maryland. These aquifers generally have good water quality and approximately 20 percent of the formations have the potential to yield water at rates of 50 gallons or more per minute (USAG, Fort Detrick, 2003a). Most of the wells in the area draw water from fractures or solution channels located within carbonate rocks (e.g., limestone and dolomite) associated with the Frederick Valley. Groundwater is transported through the carbonate aquifers via bedding planes, fractures, joints, faults, and other partings, which have been enlarged by the dissolution of the carbonate bedrock by acidic recharge. Groundwater in the immediate vicinity of Area B flows to the southeast, toward the Monocacy River. The depth of the water table in Area B fluctuates over a great extent throughout the year and typically fluctuates up to 25 ft. during the spring (USAG, Fort Detrick, 2003a).

There is a potential for rapid transport of contaminants entering carbonate aquifer systems as a result of relatively unrestricted flow along conduits (bedding planes, fractures, joints, et.) that have been affected by dissolution. These conduits can form a highly interconnected system for relatively unrestricted flow within the aquifer system. Based on a photogeologic analysis of Fort Detrick conducted by USACOE in 2001, numerous fracture traces and lineament features occur on the surface in Area B (Figure 4-2). In addition, several sink holes occur in the area, indicating that solution weathering of carbonate rocks in the area is occurring.

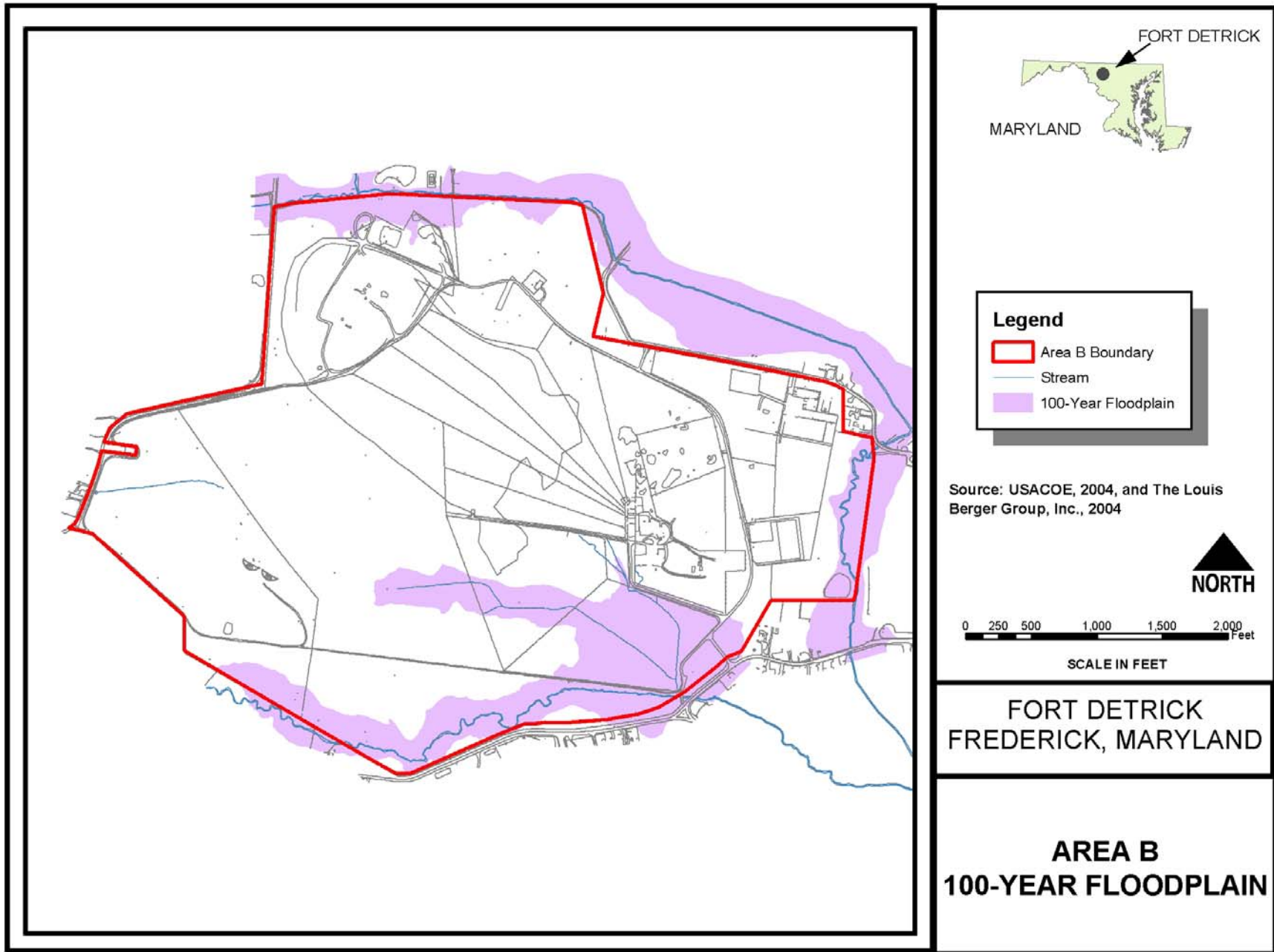


FIGURE 4-7 – 100-YEAR FLOODPLAIN

Past groundwater investigations conducted on Area B have detected the occurrence of volatile organic compounds (VOCs), such as trichloroethene (TCE), in samples. Section 4.6 Hazardous Material and Waste provides a discussion of potential groundwater contamination in Area B. Groundwater is not used for human consumption at Fort Detrick (USAG, Fort Detrick, 2003a).

4.2.4 Wild and Scenic Rivers

The Wild and Scenic Rivers Act (16 USC 1271-1287), Public Law 90-542, approved October 2, 1968, (82 Stat. 906) establishes a National Wild and Scenic Rivers System and prescribes the methods and standards through which additional rivers may be identified and added to the system. The Act provides legislative recognition that certain selected rivers have outstanding remarkable values and therefore should be preserved for all time in their free-flowing condition. The Act provides comprehensive protection against federally licensed dams, diversions, and other river development on designated river sections and sets aside a quarter-mile wide riparian corridor protection area along designated river sections. There are no federally designated Wild or Scenic Rivers in the State of Maryland.

The State of Maryland created the Scenic and Wild Rivers System by an Act of the General Assembly in 1968. The Scenic and Wild Rivers Act mandates the preservation and protection of natural values associated with rivers designated as Scenic and/or Wild. It is the policy of the State to preserve and protect the natural values of these rivers, enhance their water quality, and fulfill vital conservation purposes by wise use of resources within their surrounding environment.

A Scenic River, as designated in Natural Resources Article 8-402(d)(2), is a free-flowing river whose shoreline and related land are predominantly forested, agricultural, grassland, marshland, or swampland with a minimum of development for at least 2 miles of the river length. A Wild River, as designated in Natural Resources Article 8-402(d)(3), is a free-flowing river whose shoreline and related land are undeveloped, inaccessible except by trail, or predominantly primitive in a natural state for at least 4 miles of the river length. Government agencies, in recognizing the intent of the Act and the Scenic and Wild Rivers Program, are required to take whatever actions are necessary to protect and enhance the qualities of a designated river.

The Monocacy River and the Potomac River in Frederick and Montgomery Counties have been designated as Scenic Rivers by the Maryland General Assembly. Fort Detrick is located within the Monocacy River drainage basin, which is a sub-basin of the Middle Potomac River Basin. The Monocacy River is located approximately two miles to the east of Area B and flows south and joins to the Potomac River approximately 15 miles south of the City of Frederick. Carroll Creek flows from the southeast corner of Area B south and east for approximately 3.5 miles before joining the Monocacy River.

4.2.5 Wetlands

EO 11990, Protection of Wetlands, states that federal agencies are to avoid to the extent possible long-term and short-term impacts associated with the destruction or modification of wetlands and to avoid direct and indirect support of new construction in wetlands whenever practical alternatives exist. The USACOE (Federal Register 1982) and the U.S. Environmental Protection

Agency (USEPA) (Federal Register 1980) jointly define wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR, Part 328.3). The USACOE regulates development in wetland areas pursuant to Section 404 of the Clean Water Act (33 CFR, Parts 320-330). Three elements are used to identify wetlands: hydrology, hydrophytic vegetation, and hydric soils.

The USACOE conducted a jurisdictional wetland delineation on Area B on 8, 9, and 10 March 2004. Based on the draft Wetland Delineation Report for Fort Detrick Area B (USACOE, 2004), there are 5 wetlands in the open field area encompassing 6.65 acres that were determined to be jurisdictional wetlands on Area B. The wetlands drain into the unnamed tributary to Carroll Creek that flows along the southern boundary of Area B, and the unnamed drainage that flows across the central and southeastern section of the site. Two ponds of 0.15 and 0.36 acres were also delineated on Area B. The ponds were determined to possibly represent transitional wetland features. Post Pond, located in the southeastern section of Area B has also been considered as a wetland in past reports, but was not determined to be jurisdictional in the 2004 delineation. Figure 4-8 shows the locations and extent of jurisdictional wetlands on Area B based on the 2004 delineation.

Wetlands occurring on Area B have been impacted by past land use, mowing, and grazing. Grazing was discontinued on Area B in 2003. Vegetation occurring in the wetlands at the time of the delineation reflected past land management practices and seasonal effects. The dominant species identified over most of the wet meadow habitats was creeping bent grass (*Agrostis stolonifera*). Ladysthumb (*Polygonum persicaria*) and slender rush (*Juncus tenuis*) were also identified as dominant species. Kentucky blue grass (*Poa pretensis*), a predominantly upland grass, was identified as a dominant species at locations in wet meadows. The upland grass probably became established in the wetlands as a result of past grazing and mowing of the wet meadows. Examples of other plants occurring in the wetlands include soft rush (*Juncus effuses*), green bulrush (*Scirpus atrovirens*), peppermint (*Mentha X piperita*), and New York ironweed (*Vernonia novaboracensis*).

4.3 BIOLOGICAL RESOURCES

This section describes the biological resources occurring in Area B. Vegetation types and wildlife habitats were characterized on the basis of both existing documentation and field observations. A reconnaissance of the project area was conducted in February 2004 to verify data from previous biological reports and gather additional information on wetlands, vegetative communities, and wildlife habitats on and in the vicinity of Area B.

4.3.1 Vegetation

Vegetation occurring in Area B is characteristic of open farmland habitats of northern Maryland. Past intensive grazing on the open spaces in Area B has reduced the diversity of plants that would normally be expected to occur in similar natural grassland and forested communities in this region. Area B is characterized primarily as a large open field composed of pasture land

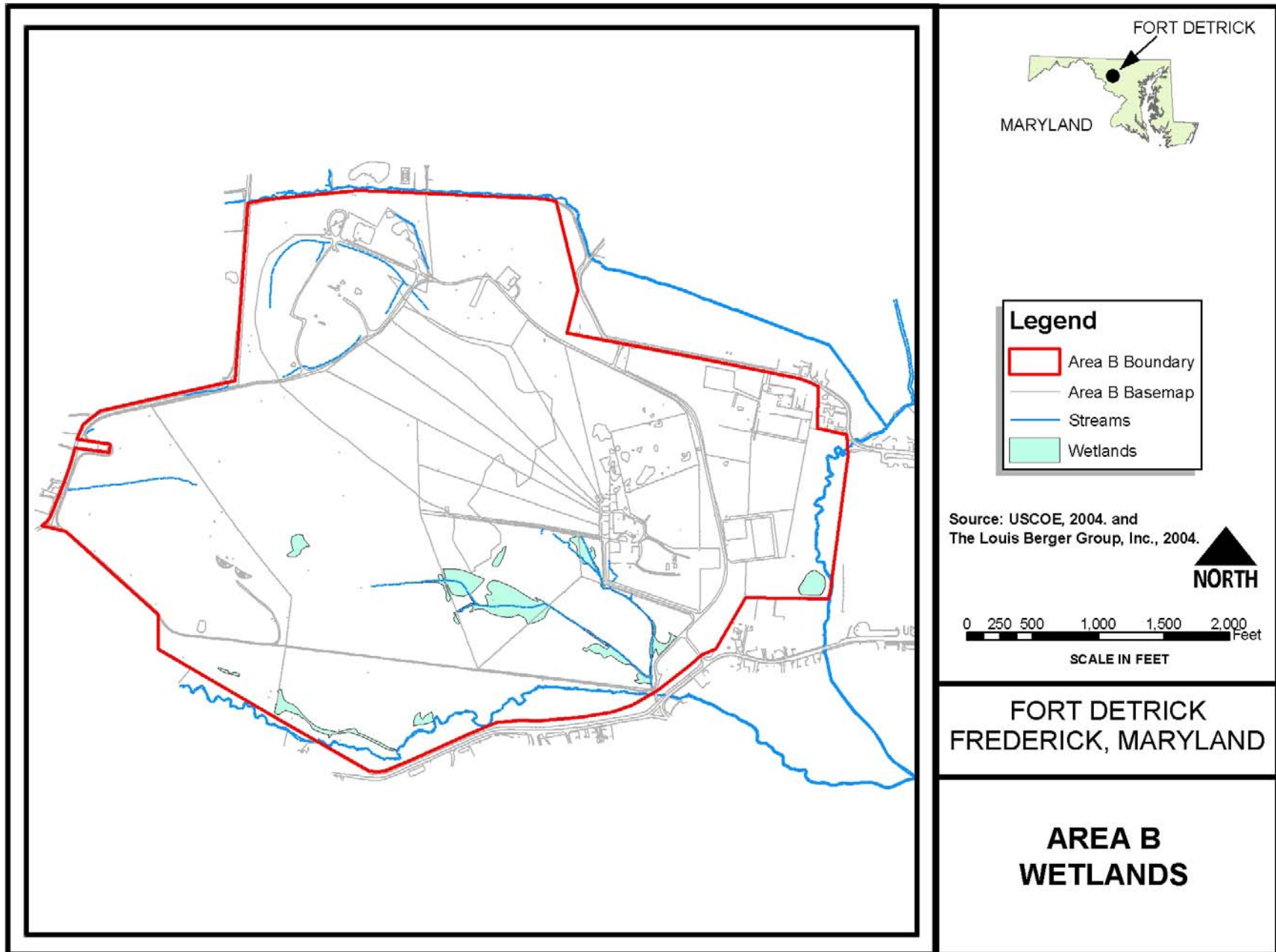


FIGURE 4-8 – AREA B WETLANDS

with bluegrass, fescue, and other common grasses and forbs typical of the region. Wooded areas occur primarily around the perimeter of Area B.

There are two forest blocks on Area B. Forest Block 1, is approximately 10.0 acres and is located in the northwestern corner of Area B. Block 1 is a planted grove with an immature understory and minimal species diversity. The understory is not well developed, and two large openings cut through the block at perpendicular angles that effectively separate the tract into four small forested areas. There has also been some dumping in the past on areas adjacent to and within Block 1. Examples of tree species occurring in Block 1 include black locust (*Robinia pseudoacacia*), tree of heaven (*Ailanthus altissima*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), mulberry (*Morus* spp.), and hackberry (*Celtis occidentalis*).

Forest Block 2 is located to the south of Block 1 adjacent to the western boundary of Area B. Forest Block 2 comprises approximately 9.0 acres. Examples of tree species occurring in Block 2 include red maple, sycamore (*Platanus occidentalis*), white oak (*Quercus alba*), northern red oak (*Q. rubra*), southern red oak (*Q. falcata*), American elm (*Ulmus americana*), tulip poplar (*Liriodendron tulipifera*), silver maple (*Acer saccharinum*), black locust, black walnut (*Juglans nigra*), hackberry, black cherry, sassafras, and tree of heaven. Examples of dominant species occurring in the understory include greenbrier (*Smilax rotundifolia*), mayapple (*Podophyllum peltatum*), and poison ivy (*Toxicodendron radicans*).

Additional small wooded areas occur in the northeast corner and along the eastern boundary of Area B. Examples of trees occurring in these areas include red maple white oak, pin oak (*Q. palustris*), American elm, Siberian elm (*Ulmus pumila*), black locust, honey locust (*Gleditsia triacanthos*), tulip poplar, hackberry, black cherry, white pine (*Pinus strobus*), red pine (*Pinus resinosa*), black walnut, and tree of heaven.

Vegetated riparian areas occur in association with Carroll Creek along the eastern boundary and an unnamed tributary to Carroll Creek that borders the southern boundary of Area B. Examples of trees occurring in association with the riparian areas include silver maple, cottonwood (*Populus deltoides*), weeping willow (*Salix babylonica*), black willow (*Salix nigra*), American elm, black locust, bitternut hickory (*Carya cordiformis*), white ash (*Fraxinus americana*), tulip poplar, black walnut, mulberry, and tree of heaven. Trees in the riparian zone located along the southern boundary of Area B occur essentially in a single row that follows the creek. An area of approximately 1,000 sapling sized trees that were planted in 1997 occurs adjacent to the stream in the southwestern section of Area B. An additional area of trees was also planted along the eastern boundary of the site. The riparian area located along the eastern boundary of Area B is more diverse with a more mature understory and better evidence of re-growth than the area along the southern boundary.

Fort Detrick Forestation Plan

Existing forested area on Fort Detrick includes 30.82 acres on Area B. Figure 4-9, a land use constraints map, shows the location of the existing forested areas on Area B. The Maryland Forest Conservation Act was passed to prevent further loss of forest due to construction. This act requires identification of existing forest stands, protection of the most desirable tree stands and establishment of areas where new forests can be planted (Natural Resource Article 5-1605;

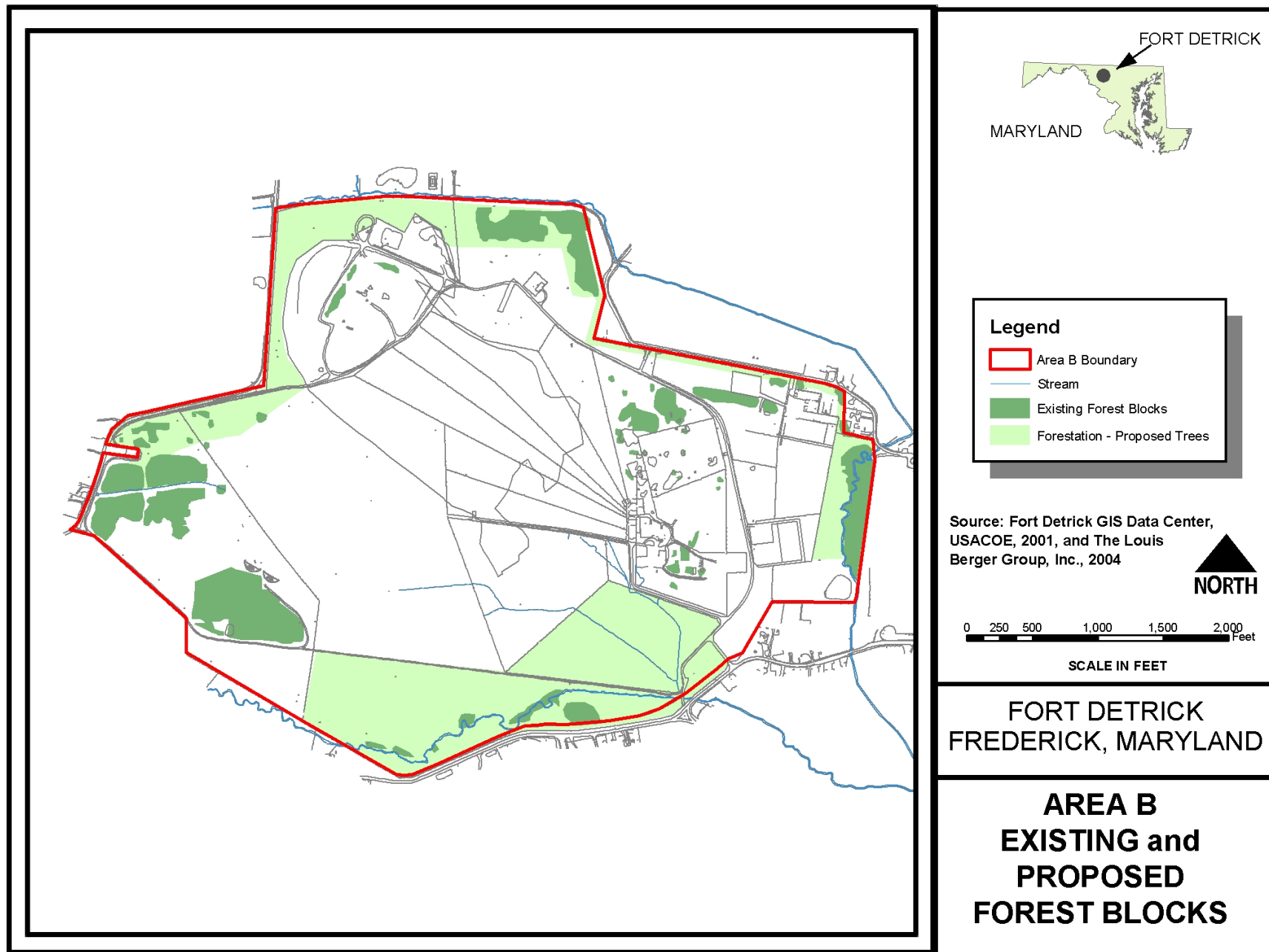


FIGURE 4-9 – EXISTING AND PROPOSED FOREST BLOCKS ON AREA B.

COMAR 08.18.04). Fort Detrick falls under the Land Use Type “Institutional Development Area” that includes schools, colleges, universities, and military installations. Under this land use, there is an afforestation threshold of 15%. The Maryland Forest Conservation Act requires that Fort Detrick have a forest conservation plan, participate in the afforestation/forestation process, and sign a forest maintenance agreement. Any construction project that occurs on the installation and disturbs over 40,000 SF (0.92 acres) of land must mitigate the disturbance through forestation of 15 percent of the equivalent surface area. When clearing of the forested land occurs, the cleared forested area is replaced at a planting grade of 2 acres for every acre removed. Maryland Department of Natural Resources (MDNR) must approve forestation plans before the project can break ground. The Forest Service can visit Fort Detrick at any time to inspect for compliance. There is a minimum two-year agreement with MDNR to ensure survivability. There must be a 65% survival rate at the end of a two-year period after planting. Planting can occur from the beginning to the end of project development and requires 436 trees per acre.

4.3.2 Wildlife Resources

Faunal associations in habitats at Fort Detrick are typical of those in agricultural landscapes in the Piedmont area of Maryland. There are also remnant and planted forested areas that have some of the forest-associated bird, mammal, and herptofauna species typical of oak-hickory and northern hardwood forests. Because of the small size of the forested blocks and other wooded areas in Area B, there are numerous edge species that occur on the site.

Based on the Integrated Natural Resource Management Plan (INRMP) for Fort Detrick (USAG, 2001), there is the potential for 57 mammal species to occur in the vicinity of the facility given suitable habitat conditions. During the period of 5-11 June 1997, mammalian surveys were conducted at Fort Detrick using Sherman live-traps, scent station track counts, and direct observations. Species identified during the surveys are typical of agricultural habitats in Maryland and include white-tailed deer (*Odocoileus virginianus*), racoon (*Procyon lotor*), opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), fox squirrel (*Sciurus niger*), eastern chipmunk (*Tamias striatus*), meadow vole (*Microtus pennsylvanicus*), white-footed mouse (*Peromyscus leucopus*), and deer mouse (*Peromyscus* spp.). Red fox (*Vulpes vulpes*) have also been observed in Area B.

Avian habitats at Fort Detrick are diverse and include riparian areas, hardwood forests, hay fields, and pasture lands. A wide variety of species have the potential to utilize Fort Detrick habitats during both the breeding season and winter. During early June 1997, an avian census of all forested habitats on Fort Detrick was conducted. Calling/singing males were identified as well as all other birds present within the forested stands. Sixty-four species of birds were identified on Fort Detrick during the study. A mist netting and banding operation was also conducted in Areas A and B during June of 1997. Twenty bird species were banded and released during the study. Based on the studies and onsite observations, examples of common bird species occurring in Area B include mourning dove (*Zenaidura macroura*), red-bellied woodpecker (*Melanerpes carolinus*), downy woodpecker (*Picoides pubescens*), barn swallow (*Hirundo rustica*), blue jay (*Cyanocitta cristata*), house wren (*Troglodytes aedon*), tufted titmouse (*Baeolophus bicolor*), Carolina chickadee (*Poecile carolinensis*), grey catbird (*Dumetella*

carolinensis), American robin (*Turdus migratorius*), eastern bluebird (*Sialia sialis*), song sparrow (*Melospiza melodia*), northern cardinal (*Cardinalis cardinalis*), common grackle (*Quiscalus quiscula*), Baltimore oriole (*Icterus baltimore*), starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), turkey vulture (*Cathartes aura*), Canada goose (*Branta canadensis*), and mallard (*Anas platyrhynchos*).

No surveys of reptiles and amphibians have been conducted in Area B to date. Examples of species that are likely to occur on Area B include American toad (*Bufo americanus*), spring peeper (*Hyla crucifer*), green frog (*Rana clamitans melanota*), bull frog (*Rana catesbeiana*), leopard frog (*Rana pipiens*), milk snake (*Lampropeltis triangulum*), eastern garter snake (*Thamnophis sirtalis sirtalis*), northern black racer (*Coluber constrictor constrictor*), black rat snake (*Elaphe obsoleta*), rough green snake (*Opheodrys aestivus*), northern water snake (*Nerodia sipedon sipedon*), eastern fence lizard (*Sceloporus undulatus*), five lined skink (*Eumeces fasciatus*), eastern box turtle (*Terrapene carolina carolina*), eastern painted turtle (*Chrysemys picta picta*), and snapping turtle (*Chelydra serpentina*).

Carroll Creek supports a variety of fish, including rosyside dace (*Clinostomus funduloides*), carp (*Cyprinus carpio*), blacknose dace (*Rhinichthys atratulus*), longnose dace (*Rhinichthys cataractae*), bluntnose minnow (*Pimephales notatus*), creek chub (*Semotilus atromaculatus*), pearl dace (*Margariscus margarita*), white sucker (*Catostomus commersoni*), yellow bullhead (*Ameiurus natalis*), redbreast sunfish (*Lepomis auritus*), bluegill, largemouth bass (*Micropterus salmoides*), fantail darter (*Etheostoma flabellare*), Potomac sculpin (*Cottus girardi*), and rainbow trout (*Oncorhynchus mykiss*). Carroll Creek and its tributaries upstream of US Route 15 are designated as Class 111, Natural Trout Waters by the State of Maryland (USAG, Fort Detrick, 2001). Class 111 is the highest of four state water quality designations and is applied to surface water bodies that support or have the potential to support the growth and propagation of trout.

A fish survey has not been conducted in Post Pond. Species that would be expected to occur in the pond include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), green sunfish (*Lepomis cyanellus*), yellow bullhead (*Ameiurus natalis*), golden shiner (*Notemigonus crysoleucas*), and common carp (*Cyprinus carpio*).

4.3.3 Rare, Threatened, and Endangered Species

The Endangered Species Act (16 USC 1531 et seq.) mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. Section 7 of the Endangered Species Act requires federal agencies that fund, authorize, or carry out an action to ensure that their action is not likely to jeopardize the continued existence of any threatened or endangered species (including plant species) or result in the destruction or adverse modification of designated critical habitats. If Fort Detrick determines that an action may adversely affect a federally listed species, consultation with the U.S. Fish and Wildlife Service (USFWS) is required to ensure minimization of potential adverse impacts to the species or its designated critical habitat.

Informal consultation was initiated with the USFWS and the Maryland Department of Natural Resources Natural Heritage Program for information regarding species of special status with the potential to occur on or in the near vicinity of the proposed actions on Area B of Ft. Detrick.

Based on correspondence with USFWS, no federally proposed or listed endangered or threatened species are known to exist within the area of the proposed projects for Area B. Therefore, no Biological Assessment or further Section 7 consultation with the USFWS would be required.

Fort Detrick has not received a response from the Maryland Department of Natural Resources Natural Heritage Program; however, based on the INRMP for Fort Detrick there are no known rare, threatened, or endangered animal or plant species on Fort Detrick (USAG, 2001).

4.4 AIR QUALITY

USEPA defines ambient air in 40 CFR Part 50 as “that portion of the atmosphere, external to buildings, to which the general public has access.” In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAAA) 42 USC 7401 et seq., USEPA has promulgated ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the USEPA has issued National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), particulates with a diameter less than or equal to a nominal 10 micrometers (PM₁₀), ozone (O₃), nitrogen dioxide (NO₂), and lead (Pb). Federal actions located in non-attainment areas are required to demonstrate compliance with the general conformity guidelines established in 40 CFR Part 93, *Determining Conformity of Federal Actions to State or Federal Implementation Plans* (the Conformity Rule). Under this rule, an air conformity applicability analysis must be performed for projects in non-attainment areas to determine if a formal conformity determination must be made.

The USEPA has classified Frederick County, Maryland, including Fort Detrick, as in severe non-attainment for the criteria pollutant ozone. Frederick County is located in the Washington metropolitan region, which is designated as a severe ozone "nonattainment area" by the USEPA (MDE, website, 2004). Other Maryland counties located in the Washington metropolitan region include Calvert, Charles, Montgomery, and Prince Georges. The NAAQS for ozone is presented in Table 4-1 (MDE, website, 2004). The proposed projects for Area B are located within an area designated by the USEPA as a severe ozone non-attainment area; therefore, a General Conformity Rule applicability analysis is warranted.

TABLE 4-1 – AMBIENT AIR QUALITY STANDARDS FOR OZONE

Pollutant	Federal Standard	Maryland Standard
Ozone (O ₃) ¹		
1-Hour Average	0.12 ppm	0.12 ppm
8-Hour Average	0.08 ppm	0.08 ppm

¹ Federal primary and secondary standards for this pollutant are identical.
Source: MDE, website, 2004

Section 93.153 of the general Conformity Rule sets the applicability requirements for projects subject to the Rule through the establishment of *de minimis* levels for annual criteria pollutant emissions. These *de minimis* levels are set according to criteria pollutant non-attainment area

designations. Projects below the *de minimis* levels are not subject to the Rule. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The *de minimis* levels apply to direct and indirect sources of emissions that can occur during the construction and operational phases of the actions.

To determine the applicability of the Rule to this action, emissions were estimated for the ozone precursor pollutants – oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). Annual emissions for these compounds were estimated for each of the project actions (construction and operation) to determine if they would be below or above the *de minimis* levels established in the Rule. The results of this analysis are provided in Appendix B. The *de minimis* level for severe ozone areas is 25 tons per year (tpy) for each ozone precursor pollutant. Sources of NO_x and VOC associated with the proposed projects include emissions from construction equipment, construction crew commuting vehicles, and painting parking spaces and interior buildings (VOCs only). Operational emissions, such as from the increase in customer and operator vehicle use and emergency generators were also included in the analysis.

4.4.1 Ambient Air Quality

Ambient air quality is monitored in Frederick County by a station that meets USEPA's design criteria for State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS). This monitoring station is located in the City of Frederick at the Frederick County Health Department on Montevue Lane, which is adjacent to Area B. This monitoring station has been in operation since 1995 and has only exceeded the standard for ozone two times; once in 1998 and again in 1999. This station did not exceed the standard for ozone in 2000 or 2001 (MDE, website, 2004).

4.4.2 Meteorology/Climate

Temperature is a parameter used in calculations of emissions for air quality applicability. The average annual temperature at Fort Detrick is 54 degrees Fahrenheit (°F). Temperature extremes in the area range from -12 °F in the winter to 109 °F in the summer. The climate in Frederick County is characterized by four distinct seasons with short, warm, and occasionally humid summers and mild winters with occasional cold periods. In Frederick County average annual precipitation and snowfall are 40.8 inches and 26.4 inches respectively. Prevailing winds in the Fort Detrick area are west-southwesterly and have an annual average velocity of 7.4 miles per hour (USGA, Fort Detrick, 2003a).

4.4.3 Odors

Odor sources emanating from Area B of Fort Detrick originate from the landfill and routine operations conducted at the Installation. Garbage odors arise during the transport of waste to the landfill. Animal odors may occur at the LARF. Fuel odors may arise during refueling procedures of emergency generators from the proposed AFMESA activities (USGA, Fort Detrick, 2003a).

4.5 HISTORICAL AND CULTURAL RESOURCES

The National Historic Preservation Act (NHPA) and other Federal laws and regulations require DA to protect prehistoric and historic cultural resources that are located on DA property. AR 200-4 (Cultural Resources Management) directs the installation to maintain an Integrated Cultural Resources Management Plan (ICRMP). The ICRMP replaces the Cultural Resource Management Plan (CRMP) that was prepared under a previous Army regulation. The ICRMP provides guidance for complying with the NHPA of 1966 and other applicable Federal laws and regulations. The ICRMP applies only to those properties controlled by DA at the installation (USACOE, 2000). Based on an inventory and evaluation of all installation structures constructed prior to 1946, there are no structures or archaeological sites located on Area B that are currently listed or are eligible for listing in the National Register of Historic Places (NRHP).

Informal correspondence was initiated with the Maryland State Historic Preservation Officer (SHPO) to determine potential cultural resources in the study area. As of May 6, 2004, Fort Detrick has not received a response from the Maryland SHPO.

4.5.1 History

Settlement of the Frederick County area began during the early 1700s. The town of Frederick was chartered in 1735 and the county was created on June 11, 1748 by the Maryland Provincial Assembly. The region around the site occupied by Fort Detrick was important in many events in the history of the United States, including the French and Indian War, the Revolutionary War, and the Civil War (USACOE, 2000).

In 1929, Frederick County opened a small municipal airfield on 90 acres of land north of the city. The airfield was leased to the Maryland National Guard in 1931 for a summer training camp. The field was named Detrick Field in honor of Major Frederick Lewis Detrick, a Frederick native and World War I veteran. The Army Air Corps leased the property to train its military pilots in 1940 and abandoned the airfield after mobilization for WWII began. The U.S. Biological Warfare Program was established in 1941 by President Roosevelt and in 1943 the Army Chemical Warfare Service purchased Detrick Field from the City of Frederick. The site was established for research and development of biological warfare techniques and agents for offensive and defensive purposes. By 1945, Camp Detrick consisted of 245 buildings, including housing for 5,000 workers. Only 80 of those buildings remain today (USACOE, 2000).

Camp Detrick was designated a permanent installation shortly after World War II. In 1956, Camp Detrick was formally designated as Fort Detrick following the purchase of Area C (the water and sewage plants) and Area B (the outdoor test area) in 1944, and additional portions of Area A between 1946 and 1952. Area B was originally purchased to provide a test area for the biological weapons program. Section 4-17 *Land Use* describes the test area, which was used to test the flow of biological simulants through the air. Area B has also been historically used as a sanitary landfill and a disposal site. Following the discontinuation of the offensive biological warfare research program in 1969, former biological research facilities were either converted to other biomedical research activities or to administrative purposes. In 1972, a new cancer research mission was established at Fort Detrick with the arrival of the National Cancer Institute-Frederick (USAG, Fort Detrick, 2003a).

4.5.2 Architectural and Archaeological Resources

Fort Detrick is located in the Monocacy River Drainage Basin of the Piedmont Province, which is part of Maryland Archeological Unit 17. The 1992 CRMP for Fort Detrick determined that approximately 625 acres in Areas A, B, and C might have high potential for archeological resources (USACOE, 1992). A Phase I Archeological Survey was performed at Fort Detrick from October 1992 through January 1993 (USACOE, 1993). This study was conducted in accordance with recommendations set forth in AR 420-40, Historic Preservation, and the CRMP for the installation. This investigation was intended to assist the DA in carrying out responsibilities outlined in Section 106 and 110 of the NHPA.

Of the 625 acres investigated during the Phase I study, a total of eight sites were discovered and/or examined. Of these eight sites, two sites are located within Area B, 18FR679 and 18FR682. A Phase I investigation of the Prehistoric Site 18FR679 determined that the site lacked integrity and archeological research potential; therefore, no further action was considered warranted for this site. The second site (18FR682) on Area B was a Historic Site that consisted of a lime kiln. The kiln was identified by its rubble foundation, a chimney fall, and early twentieth century fill material. Additionally, late nineteenth century to early twentieth century artifacts were recovered from the site. Some pieces of stoneware were also found. Unaltered kitchen items (not burnt or broken) were recovered from the kiln and suggest that these items may have been placed in the kiln after its operation had ended. This site may provide information regarding historic occupation of the Monocacy Valley, such as nineteenth century farming and cottage industries. A Phase II study of the lime kiln site indicated that there is a lack of archeological and structural integrity; therefore, the site does not qualify for NRHP listing and no further investigation of this site is warranted (USACOE, 1996; USAG, Fort Detrick, 2003a).

Additionally, directly adjacent to Area B is a small, approximately 16,000 ft², cemetery located along Kemp Road. The owner of this cemetery is unknown. Landscaping maintenance is currently provided as a community service by the local Kiwanis Club (Gaver, pers.comm. 3/19/04).

4.6 HAZARDOUS MATERIAL AND WASTE

This section describes the hazardous material and waste issues within Area B. As noted below, Fort Detrick has active investigation and remediation work in progress at several locations within Area B. As all of these sites are located in Area B, their potential impacts need to be considered on the proposed actions evaluated in this environmental assessment.

4.6.1 Environmental Concerns in Area B

Fort Detrick is not listed on the National Priority List; however, due to contamination from past activities, the Maryland Department of Environment (MDE) requires that remedial investigations be conducted at Fort Detrick. The Army implements its environmental restoration program subject to and in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (USAG, Fort Detrick, 2002). Areas of concern are tracked in the Army Environmental Database, Restoration (AEDB-R), part of the Defense

Environmental Restoration Program. Environmental investigations and clean-up activities on Fort Detrick are conducted in coordination with the Fort Detrick Restoration Advisory Board (RAB), which was created in 1993. The RAB is composed of members of the community and governmental representatives of DA, USEPA, and MDE, and serves to facilitate the exchange of information on the remedial investigations and activities and to include the RAB in the clean-up decision-making process.

Area B contains 12 areas of environmental concern. These areas include: Area B outdoor simulant testing grid (B-Grid), ammunition storage area (B-Ammo), Area B-skeet range, B-20 detonation areas, Area B-1 landfill, Area B-11 landfill, Area B-2 landfill, Area B-3 inactive landfill, Area B-6 landfill, Area B-8 landfill, the Area B-10 and B-Grove landfills, and the Area B-18 landfill site. The locations of the areas of concern are shown on Figure 4-8. The current status of the investigation of each site, as described in the installation Master Plan for Fort Detrick (September 2003), is described below.

Based on the remedial investigation (RI) data collected to date for the B-20, B-Grid, B Ammo, and skeet range areas, Fort Detrick expects to perform limited additional sampling in these areas and then to recommend closure with no further action.

Fort Detrick considers the landfills as the primary areas of potential concern and expects further investigation and possible remedial action in these areas. These former landfill areas are more appropriately called "disposal areas", as they consist primarily of unlined pits, trenches, and fill areas that were used to dispose of various wastes and debris. Due to the projected cost to excavate and remove buried materials, Fort Detrick now expects the landfill areas to be contained with a remedy of presumptive capping to minimize exposure to debris left in place. Investigation activities are ongoing for these disposal areas, therefore the location, size, and extent of the potential contamination are not known with certainty. The approximate locations and extent of these areas are shown on Figure 4-10.

The Environmental Baseline Survey (EBS) for Area B Hotel/Conference Center Complex, Fort Detrick, Maryland dated August 9, 1999 suggests that contractors be prohibited from developing the contaminated areas on Area B through lease restrictions (USAG, Fort Detrick, 1999).

Area B Outdoor Simulant Testing Grid (B-Grid) (FTD 05)

The outdoor simulant testing grid was installed in the late 1940s to observe the dissemination of biological simulants (non-pathogenic microorganisms and *Bacillus globigii*). Agents were airdropped or dispersed as aerosols, with detonation of ordnance as a part of the test program. It is reported that limited outdoor testing of simulants may have begun as early as 1944. Currently the site is used for pasture land for the USAMRIID animal farm and leased grazing areas.

The Army plans to collect additional soil samples in this area. It is anticipated that the additional data will allow Fort Detrick to prepare and submit a decision document to MDE recommending no further action at this site the Installation Restoration Program (IRP)/Defense Environmental Restoration Program (DERP).

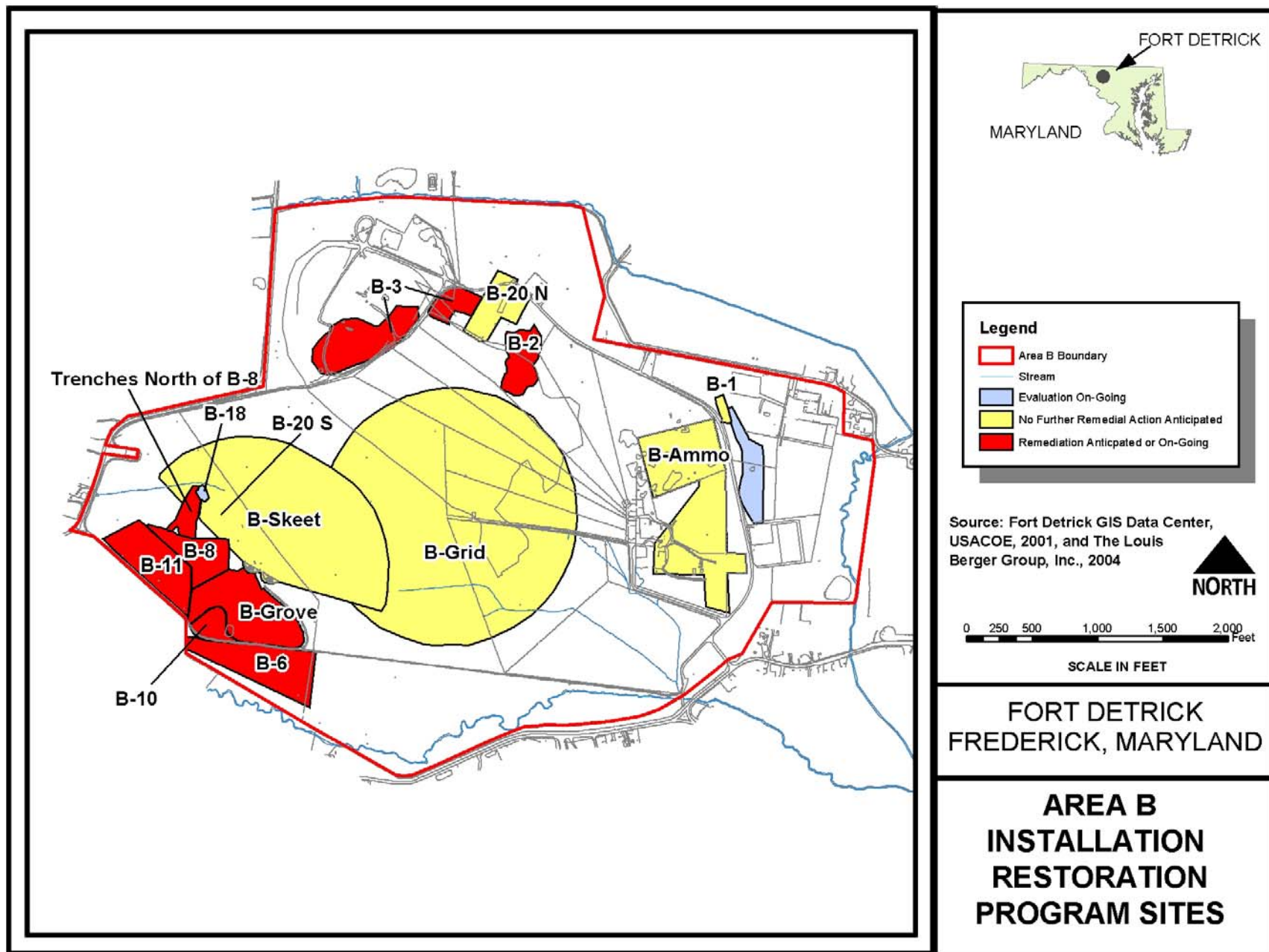


FIGURE 4-10 – INSTALLATION RESTORATION PROGRAM SITES ON AREA B.

Ammunition Storage Area (B-Ammo) (FTD 07)

Prior to 1971, munitions storage and loading facilities were present on the eastern portion of Area B. There were six subareas where munitions were stored in magazines and a munitions loading building. The storage facilities consisted of eleven above-ground magazines, one earth-covered magazine, and three smaller magazines. The materials were removed and the buildings decontaminated in the 1970s. All the magazines except Building 1215 were dismantled in 1971. The site is currently pasture and storage areas for the USAMRIID animal farm.

Surface and subsurface soil samples were taken. After reviewing data generated during the RI, the Army, MDE, and USEPA have determined that data gaps are present. The Army plans to collect additional RI/Feasibility Study (RI/FS) data. It is anticipated that these additional data will allow Fort Detrick to prepare and submit a decision document to MDE recommending no further action at this site under the IRP/DERP.

Area B-Skeet Range (FTD 29)

The skeet range is located in Area B and extends in a fan-like direction north of a point in the southwestern corner. It was used by military and civilian personnel as a recreational skeet range from the 1950s. It was deactivated in 1999. Surface and subsurface soil samples demonstrated elevated levels of lead. In 2001, the range surface area was scraped to remove a majority of the lead and clay pigeon contamination. Soils that did not meet Toxicity Characteristic Leaching Procedure (TCLP) concentrations for lead were removed as hazardous waste. The remaining soils were used at the Fort Detrick landfill as daily cover. Additional sampling will be conducted to define the extent of any remaining contamination and provide more accurate information for the RI. Based upon limited sampling performed during the removal, it is anticipated that no further remedial actions will be needed for this site.

B-20 Detonation Areas (FTD 43)

There were two explosive burn disposal areas located in Area B, one in the north and the second in the southwest area within the fan of the skeet range. Area B-20 north was used as a controlled burn area for the destruction of small amounts of explosives. The site is currently an open grass field. After reviewing data generated during the RI, the Army, MDE, and USEPA have determined that data gaps are present. The Army plans to collect additional RI/FS data. It is anticipated that this additional data will allow Fort Detrick to prepare and submit a decision document to MDE recommending no further action at this site under the IRP/DERP.

Area B-20 South was used as a controlled burn area for the destruction of small amounts of explosives. Surface and subsurface soil samples were taken. Pending determination of background metals concentrations, it is anticipated that no further remedial action will be needed for this site.

Area B-1 Landfill (FTD 48)

This 0.5-acre landfill is located in the northeastern portion of Area B. It was reported to have operated from 1948 to the mid-1970s receiving unknown quantities of metals, wood, and general

refuse from laboratory remodeling and building demolition. All material was decontaminated prior to disposal. The site is currently part of Flair U.S. Army Reserve Center.

The disposal site was not found to exist in the area identified by pre-RI information. However, within the area originally defined as the B-1 landfill, no further investigation is required. Based upon the data generated during the RI, Fort Detrick will prepare and submit to MDE a decision document recommending no further action at the area defined as B-1 under the IRP/DERP. However, Fort Detrick will perform further field analysis and ground-truthing to determine if additional RI/FS work is needed in adjacent areas.

Area B-11 Landfill (FTD 49)

This landfill is part of the larger 19.6-acre landfill including sites FTD 69, 70, and 71. It is located on the southwest side of Area B. Area B-11 received wastes from Fort Detrick, U.S. Bureau of Standards, and Walter Reed Army Medical Center. Materials disposed of at this site included: metals, wood, and general waste from laboratory modifications and building demolitions; general housing refuse from Area A; excess laboratory chemicals; and general household refuse from the mid-1950s to the early 1970s; trichlorethylene (TCE) and perchloroethylene (PCE) drums; radiological materials including radioactive carbon; sulfur; and phosphorus compounds.

Groundwater monitoring results showing detections of TCE and PCE leaving the post at levels above maximum contaminant levels (MCLs) is believed to be associated with Area B-11. A decision document was signed in fiscal year (FY) 2000 for the interim removal action (IRA) of one known and two suspected chemical waste pits in B-11 thought to be the source of the TCE and PCE groundwater contamination (the groundwater investigation is discussed further below). The IRA determined that there were four disposal pits with sizes much larger than anticipated. Excavation activities at these four pits have been completed, and the pits have been backfilled with clean soil.

The IRA has had significant cost increases due to increased volumes of waste and the discovery of live bacteria in heat sealed vials disposed with the research wastes. This resulted in significant changes to the project due to the additional disposal costs and the inclusion of biological testing and disinfection steps.

The remaining areas of the B-11 landfill will need further examination to determine the future response. However, intrusive investigations will be minimized due to the discovery of live pathogens in the B-11 IRA. It is anticipated no further removal actions will be needed for adjacent areas; however, other remedial actions, such as capping, are being considered for the remaining areas on B-11. Additional investigations will be conducted to provide more accurate information for the FS.

Area B-2 Landfill (FTD 50)

This 1.2-acre landfill is located in the north central portion of Area B. It operated between 1948 and the mid-1970s, receiving unknown quantities of metals, wood, and general refuse from laboratory remodeling and building demolition. All material was decontaminated prior to disposal. The area is currently open grassland used for grazing. Intrusive investigations into this

landfill will be minimized due to the discovery of live pathogens in the B-11 Landfill. It is anticipated that a presumptive capping remedy may be required for this site.

Area B-3 Inactive Landfill (FTD 51)

This 5.0-acre landfill is located on the north side of Area B. The active portion of the landfill was not investigated as part of the RI. Seven or eight unlined landfills operated from the 1950s. They received metals, wood, general refuse from laboratory remodeling and building demolition, drums, herbicide and insecticide waste, and autoclaved animal carcasses. Laboratory glassware is also present. All materials were reported to have been decontaminated prior to disposal. The current site is partially open grassland with the remainder underlaying the current permitted active landfill. Intrusive investigations into this landfill will be minimized due to the discovery of live pathogens in the B-11 Landfill. It is anticipated that a presumptive capping remedy may be required for this site.

Area B-6 Landfill (FTD 69)

This area is currently undeveloped grassland located in the southwestern corner of Area B. From 1948 until 1960 this area received construction material waste (e.g., metal, wood) and autoclaved carcasses of large and small animals. All animal carcasses used in biological agent research were routinely autoclaved and some were incinerated prior to burial. Possible contamination of this area could include ash, heavy metals, medical waste, and/or biological agents. Due to data gaps present for this site, further investigations for this area are planned. Intrusive investigations into this landfill will be minimized due to the discovery of live pathogens in the B-11 IRA. It is anticipated that a presumptive capping remedy may be required for this site.

Area B-8 Landfill (FTD 70)

This site is currently undeveloped grassland located on the western side of Area B. From 1948 to 1972 this area received a variety of wastes including construction materials (e.g., wood, metal), general refuse, radiological materials, decontaminated biological agent liquid waste, and paint sludge from Buildings 375 and 384. After biological warfare work was ceased in 1969-1972, stringent decontamination of all holding tanks was completed. Testing indicated that inorganic material from the holding tanks in Building 375 was found to contain *Bacillus anthracis*. This material was thoroughly sterilized and repeatedly tested for anthrax growth after the sterilization procedure was complete. After demonstrating negative test results for anthrax growth, approximately 150 tons of sterilized liquid waste and decontaminated paint sludge was disposed of in the Area B-8 landfill. Due to data gaps present for this site, further investigations for this area are planned. Intrusive investigations into this landfill will be minimized due to the discovery of live pathogens in the B-11 IRA. It is anticipated that a presumptive capping remedy may be required for this site.

Area B-10 and B-Grove Landfills (FTD 71)

This site is currently undeveloped grassland and forested area in the southwest portion of Area B. From 1965 to 1970 this area received general housing refuse and autoclaved and incinerated animal carcasses. The tree-covered area making up the B-Grove portion of this site was also reported to be a disposal area for unregulated household trash and miscellaneous debris, such as

metal containers and laboratory glassware. Due to data gaps present for this site, further investigations for this area are planned. Intrusive investigations into this landfill will be minimized due to the discovery of live pathogens in the B-11 IRA. It is anticipated that a presumptive capping remedy may be required for this site.

Area B-18 Landfill (no official FTD site)

This area received a variety of waste up until 1950. The exact location of this landfill has not been determined, however, a ground-truthing survey of a tree area/sinkhole behind Area B-20 revealed surface debris and waste. This may prove to be the true location of this disposal area. A more thorough survey and investigation of this sinkhole area are planned. Intrusive investigations into this landfill will be minimized due to the discovery of live pathogens in the B-11 Landfill. It is anticipated that a presumptive capping remedy may be required for this site.

4.6.2 Groundwater Contamination

Area B-11 (FTD 49) is thought to be the primary source of groundwater contamination and the subject of an on-going remedial investigation at Fort Detrick. TCE, which is a suspected carcinogen, was detected in a groundwater monitoring well located near the southeastern border of Area B in March 1991. In October 1992, the MDE and the Frederick County Health Department sampled the drinking water supplies for seven households near Area B. Contamination was detected in some of the sampled wells. Concentrations of TCE and/or PCE, also a suspected carcinogen, in two wells exceeded MCLs established by the USEPA. The affected households were provided with bottled drinking water until they were connected to the City of Frederick water supply. Testing by the MDE and the Frederick County Health Department detected levels of TCE, PCE, and other VOCs in 16 of 33 drinking water supply wells sampled around Area B, including four homes with contamination at or exceeding MCLs. Subsequently, a full investigation of the contamination in Area B was initiated.

In the 1999 Hotel/Conference Center Complex EBS, the USAG, Fort Detrick recommended that development on Area B be conducted in a manner such that impacts on groundwater and groundwater flow would be minimized, i.e., all structures must be limited to shallow foundations and earthwork above the contaminated groundwater plume. Fort Detrick and the MDE have discussed and agreed upon general parameters for these potential limitations (USAG, Fort Detrick, 2002). In particular for the current proposed actions, suitability of the groundwater for watering on the proposed golf course will need to be evaluated.

4.6.3 Hazardous Material Management

The Superfund Amendments and Reauthorization Act (SARA) established the reporting requirements for the storage of hazardous materials. SARA requires that the owner or operator of any facility that stores hazardous materials in reportable quantities must provide a list of all hazardous materials stored and the corresponding quantities and Material Safety Data Sheets (MSDSs) to the appropriate state and local emergency response planning committees and the local fire department.

Tenants and organizations at Fort Detrick are responsible for obtaining their own hazardous materials. Individual tenants obtain hazardous materials from private manufacturers for shipment directly to their facilities. Hazardous materials are then stored in or near the users' laboratories - typically in cabinets, refrigerators, or freezers. In addition to agency-specific Standard Operating Procedures (SOPs), all tenants must comply with the requirements of Federal, state, local, and DA regulations with regard to the procurement, use, storage, and disposal of hazardous materials. Fort Detrick Regulation (FD REG) 200-3 and Fort Detrick Pamphlet (FD PAM) 200-3a provide procedures and guidelines for the management of hazardous materials.

The Hazardous Material Management Office (HMMO) is in the process of implementing an inventory program and a centralized database for all tenant purchases, storage, and use of hazardous chemicals.

4.6.4 Hazardous Waste Management

Hazardous waste and spent hazardous material (SHM) at Fort Detrick is collected at designated Satellite Accumulation Points (SAPs) on the Installation. Disposal of hazardous waste and SHM must be performed in accordance with applicable Federal, state, local, and DA regulations. An SAP is a hazardous waste collection area where a generator may accumulate up to 55 gallons of hazardous waste or 1 quart of acutely hazardous waste (i.e., P-listed). SAPs are typically located near the point of generation and are under the control of the facility operator. All containers in a SAP must be clearly marked as "Hazardous Waste." Labels must include the accumulation date and an appropriate description of the contents. The accumulation date is the date that the waste leaves the SAP, which simultaneously starts the 90-day time period that hazardous waste may be stored in a temporary storage area. Additional requirements for the operation of SAPs are provided in FD PAM 200-3b. Hazardous waste containers are transported by HMMO from a SAP to an approved temporary storage area.

Overall the types and quantities of hazardous waste generated from Area B at Fort Detrick has varied considerably in the past 6 years due to remediation projects, such as, the Area B-11 Landfill (FTD 49) and the Area B-Skeet Range (FTD 29) projects. During normal operational conditions of the current facilities in Area B, prior to the remediation projects, production of hazardous waste was limited. For example, in 1998, during normal operational conditions the facilities in Area B produced only 88 lbs of hazardous waste (Table 4-2).

Area A and Area B operate under USEPA Hazardous Waste Generator Nos. MD8211620267 and MD4211600958 respectively. The generation, treatment, storage, transport, and disposal of hazardous waste at DA facilities are regulated by Federal, state, local, and DA regulations. AR 200-1 directs DA facilities to avoid, reduce, or eliminate the generation of hazardous waste.

TABLE 4-2 – RCRA ANNUAL HAZARDOUS WASTE QUANTITIES. 1998 - 2002.

Year	Annual Hazardous Waste Area B (lb)	Notes:
1998	88	<i>Source: USAG Fort Detrick, 2003a.</i> ¹ TCE contaminated groundwater from drilling operations. ² TCE contaminated well construction debris. ³ Lead contaminated soil from skeet range demolition and closure. ⁴ Trench B-11, pit 1 remediation project.
1999	17,500 ¹	
2000	2,019 ²	
2001	227,040 ³	
2002	3,258,248 ⁴	

4.6.5 Pesticides

All pest management activities at Fort Detrick are implemented in accordance with the current Installation Pest Management Plan (IPMP) (USAG, Fort Detrick, 2003a). The IPMP calls for chemical control, i.e., the use of pesticides, only when other pest control methods are ineffective or not practical. Pest management personnel or contractors at Fort Detrick only use USEPA or State approved pesticides as outlined in the IPMP (USAG, Fort Detrick, 2003a).

Building 122 houses the pesticide storage and mixing facilities. These facilities are constructed to meet standards as outlined in Military Handbook (MIL-HDBK) 1028/8A. Pesticides are kept in flameproof safety cabinets in a climate-controlled room that features recessed, drain-less flooring for spill containment. Pesticides are clearly labeled and separated by pesticide class. Pesticides are purchased on an as-needed basis and in small quantities that do not exceed a one-year supply (USAG, Fort Detrick, 2003a). A current (March 2003) pesticide inventory for Building 122 and additional details on pesticide use, storage, mixing, and transportation can be found in the Installation Master Plan EA.

The application of pesticides at Fort Detrick is carried out by trained and/or certified pest management personnel or by certified, licensed, outside contractors. All pesticides are applied per USEPA and state approved label directions, and pesticide applications are conducted in a manner aimed to eliminate risks to human health and to limit potential, negative impacts on the environment. To minimize spray drifts, outdoor applications of pesticides are only conducted at wind speeds below five miles per hour. Following applications, placards are placed to identify areas that received pesticide treatment (USAG, Fort Detrick, 2003a).

All excess pesticides must be returned to the Defense Logistics Agency (DLA) Materials Return Program or to the Defense Reutilization and Marketing Office. Pesticide waste, contaminated equipment, and pesticide spill residues, which are classified as hazardous materials, are disposed of in accordance with AR 200-1 and Armed Forces Pest Management Board Technical Information Memoranda No. 15 and No. 21. Non-hazardous pesticide material and pesticides are disposed of per the product's USEPA approved label.

4.7 LAND USE

4.7.1 Surrounding Communities

Fort Detrick is located within the northwest portion of the City of Frederick in Frederick County, Maryland. The western boundary of Area B is also the western edge of the City of Frederick. Areas adjacent to Area B to the north, south, and east are within the city limits of the City of Frederick.

Frederick County covers 425,472 acres of land, including 64.3 percent agricultural land, 15.4 percent woodland, 10.3 percent residential land, 5.4 percent parkland and open space, 2.5 percent utilities and government land, 1.3 percent industrial and limited industrial land, and 0.9 percent commercial land (USAG, Fort Detrick, 2003a). The City of Frederick covers an area of 18.48 square miles. According to the most recent data from the City of Frederick, 41 percent of city land is undeveloped land or woodland and the remaining land consists of 25.3 percent residential, 18.8 percent institutional, 8.4 percent industrial, and 6.4 percent commercial properties (USAG, Fort Detrick, 2003a).

Area B is located within the City of Frederick's Neighborhood Advisory Council (NAC) Area 1, which is bounded to the North and west by the city limits of Frederick, on the south by the southern boundary of Area B and Montevue Lane, and on the east by Rosemont Avenue and Yellow Springs Road. Also, to the south of Area B is NAC Area 5. NAC 5 is defined to the north by the southern boundary of Area B and Montevue Lane, on the east by Rosemont Avenue and Route 15, on the South by west Patrick Street (Route 40), and on the west by the city limits Frederick. The NAC initiative, created in 2002, is a comprehensive community development initiative designed to empower residents and neighborhoods to strengthen communities and to improve comment opportunities to develop solutions on neighborhood, traffic, safety, zoning, capital improvements, development review requests, Board of Appeals cases, and other key issues (City of Frederick, website, 2004).

The land use of Fort Detrick is classified as institutional based on the location and type of activity within the area (USAG, Fort Detrick, 2003a). Fort Detrick is not required to follow city zoning regulations; however, Fort Detrick plans future projects to be compatible with city zoning regulations. The land surrounding Area B consists predominantly of residential land to the west and north and conservation land to the northeast, east, and south. A small portion adjacent to the southeast border of Area B is used for limited industrial activities and trades (USAG, Fort Detrick, 2003a). Four single-family homes are located to the immediate east of the U.S. Army Flair Reserve Center. Several single-family homes also are located to the immediate south of this portion of Area B.

4.7.2 Area B Land Use

Area B is primarily used for agricultural research, maintenance associated with the USAMRIID LARF, training for the U.S. Army Flair Reserve Center, antenna fields, the Fort Detrick landfill, and the AFMESA.

USAMRIID conducts biological and infectious defense research to develop strategies, products, information, procedures, and training for medical defense against biological warfare agents and naturally occurring infectious diseases of military importance. The USAMRIID LARF is a 120-acre animal farm and facility composed of 108 acres of pasture.

The U.S. Army Flair Reserve Center is located on Rocky Springs Road at the northern boundary of Fort Detrick's Area B. It serves two major units including Company B, 4th Light Armored Reconnaissance Battalion, U.S. Marine Corps Reserve, and as a facility for the organization, administration and training of the Detachment 1, 301st Signal Company (Cable and Wire) U.S. Army Reserve. The 301st Signal Company is part of the 99th Regional Support Command that is located in Oakdale, PA.

The mission of AFMESA is to assess and integrate emerging U.S. Air Force (USAF), Joint, and commercial medical technologies into the Air Force Medical Service (AFMS) through realistic military utility assessments and demonstrations. AFMESA is responsible for operations facilitating rapid assessment and fielding of new technologies for medical providers. The AFMESA facilities, situated in roughly 12 acres of land, include a prefabricated modular office, eight Alaska medical shelters, two air-transportable clinic shelters, and two Compact All-Weather Mobile Shelter System (CAMSS) warehouse shelters. In addition, six Alaska medical shelters belonging to the Telemedicine and Advanced Technology Research Center (TATRC) are co-located with the AFMESA facilities.

The Fort Detrick landfill is located in the northwest corner of Area B and has a capacity of approximately 61 acres; however, only 5 acres are utilized. The landfill is permitted by the State of Maryland under Refuse Disposal Permit Number 2000-WMF-0327, valid through 04 May 2005. The landfill is only permitted to accept waste generated by Fort Detrick, which includes domestic, municipal, commercial, industrial, agricultural, and silvicultural wastes. Waste materials rejected by the landfill include controlled hazardous substances, liquid waste, special medical waste, radioactive materials, automobiles, large drums or tanks, animal carcasses, and untreated sewage (USAG, Fort Detrick, 2003a). A more detailed description of the landfill is provided in Section 4.9 *Infrastructure* under the subtitle *Solid Waste*.

4.8 TRAFFIC, ROADWAYS, AND TRANSPORTATION SYSTEMS

Numerous highways including Interstate 70, Interstate 270, U.S. Route 40, U.S. Route 15, and U.S. Route 340, provide vehicular access to Fort Detrick. Average 1998 daily traffic volumes ranged from 33,200 vehicles per day for U.S. Route 340 to almost 94,000 vehicles per day for U.S. Route 15 (USAG, Fort Detrick, 2003a). Interstate 270 and other major roadways in the area connect the Frederick area to Washington, DC, Baltimore, and other regional employment centers.

Area B may be accessed by a number of city streets, county roads, and state highways surrounding the installation. U.S. Route 15, known as the Frederick Bypass, is a four-lane divided highway, which serves regional and local commuter traffic in Frederick. It is located approximately one-half mile south of Area A. The Frederick Bypass interchanges with

Rosemont Avenue, a four-lane arterial highway serving north-south traffic east of Area B. Rosemont Avenue is maintained by the City of Frederick

Montevue Lane, the main service road to Area B, runs east-west and has a speed limit of 25 miles per hour (mph) east of Montevue Lane and 40 mph to the west. Area B is located approximately one mile west of Area A's Rosemont Avenue Gate, at the Rosemont Avenue/Montevue Lane intersection. This intersection is a four-legged signalized intersection. The current Level of Service (LOS) at this intersection is classified as level C and F during peak AM and PM hours, respectively (USAG, Fort Detrick, 2003b). Taking into consideration the projected population growth for the City of Frederick and Fort Detrick and future planned local roadway improvements, the LOS for peak AM and PM hours is projected to remain the same in 2007 for the Rosemont Avenue/Montevue Lane intersection (USAG, Fort Detrick, 2003b). After September 11, 2001, the Rosemont Gate was closed because of its proximity to Rosemont Avenue. The gate has since been re-opened with limited operations that allow outbound traffic during the afternoon between 3:00 and 6:00 PM. Between Rosemont Avenue and Shookstown Road, Montevue Lane is a 4-lane highway. Montevue Lane becomes a two-lane road west of Area B. The main gate to Area B is located on Montevue Lane in the southeast portion of Area B. Shookstown Road is a 2-lane road that runs east-west and borders Area B on the south and southwest. Kemp Lane borders the northwest portion of Area B and intersects Shookstown Road. The second access gate to Area B is located off Kemp Lane. Rocky Springs Road, another road off Rosemont Avenue, runs northeast-southwest and borders the north and east portions of the installation. The Area B access gates on Kemp Road and Montevue Lane will be used to provide access to the proposed recreational activities.

The Frederick City Bus System (TRANSIT) serves Fort Detrick with the east-west Blue Route, which provides service between downtown Frederick and Fort Detrick. The Blue Line also connects passengers to the Maryland Rail Commuter (MARC) bus station in downtown Frederick.

Major rail terminals are located in Washington, DC and Baltimore, Maryland. The Brunswick Rail Line in Point of Rocks, Maryland provides service to Washington, DC, Baltimore, Maryland, and West Virginia. A MARC bus provides service from downtown Frederick to the Brunswick Rail Line, and MARC is planning rail service to Frederick in the future. The Pennsylvania Central Railroad and the CSX Railroad system, which includes the Chesapeake and Ohio (C&O) Railroad and the Baltimore and Ohio (B&O) Railroad, provide rail freight service in Brunswick, Maryland and Harpers Ferry, West Virginia (USAG, Fort Detrick, 2003a).

The helipad located in Area A is located southwest of the commissary and is used infrequently for emergency air evacuation of medical patients and for very important person (VIP) visitors. The Frederick Municipal Airport is located approximately three miles east of Area B. The Hagerstown Municipal Airport, located 36 miles northwest of Fort Detrick, provides limited commercial passenger and cargo air service. The Baltimore-Washington International Airport, Dulles International Airport, and Reagan National Airport provide commercial airline service and are located approximately 54 miles east, 43 miles southeast, and 50 miles northwest of Fort Detrick, respectively (USAG, Fort Detrick, 2003a).

4.9 INFRASTRUCTURE

Fort Detrick maintains its own potable water and wastewater collection systems. Electricity to Fort Detrick is provided by the Potomac Edison Power Company. The following provides a brief description of utilities serving Fort Detrick and Area B.

4.9.1 Potable Water

Fort Detrick owns and maintains the installation water distribution system. Source water is withdrawn from the Monocacy River and is processed through the Fort Detrick water treatment plant (WTP) located in Area C approximately 2 miles to the east of Area B. The State of Maryland permits Fort Detrick to withdraw up to a daily average of 2.0 mgd of water with a maximum daily withdrawal of 2.5 mgd from the Monocacy River. This water allocation permit, No. FR43S001 (02) expires in 2012. Fort Detrick relies on the Monocacy River as its sole source for drinking water and diverts water to its WTP at an average rate of about 1.3 to 1.5 mgd (USAG, Fort Detrick, 2003a).

The Fort Detrick WTP has the capability to produce 4.25 mgd of finished water; however, due to the size of the existing distribution pipes, the WTP can only provide a maximum of 3.1 mgd of finished water without increasing the water pressure for distribution (USAG, Fort Detrick, 2003a). On average, the Fort Detrick WTP produces at a rate of 1.3 to 1.5 mgd. Approximately 473 million gallons of drinking water were consumed in FY 2002 (USAG, Fort Detrick, 2003a). The WTP is operating at approximately 33 percent of its water processing capacity. The Installation provides drinking water that meets or exceeds all Federal, State (i.e., COMAR 26.04.01), and DA criteria. Fort Detrick continually monitors its potable water supply for contaminants. Potable water at Fort Detrick met all USEPA and MDE drinking water standards in 2002 (USAG, Fort Detrick, 2003c).

Future demands on the water supply system could be restricted due to line pressure and pipe size and the volume of water available from the Monocacy River. The majority of the water distribution system is more than 40 years old and will likely require increased maintenance and repair to maintain integrity. A feasibility study is currently being prepared to consider an alternative passage of water from the WTP to the installation as well as construction of an additional water tower. The ability of the WTP to continue to supply Fort Detrick with sufficient quantities of drinking water is also dependent on the rate of flow and quality of the water received from the Monocacy River (USAG Fort Detrick, 2003a).

The eastern section of Area B, including the Flair Army Reserve Center, USAMRIID LARF, and AFMESA, are currently provided with potable water from the Fort Detrick WTP. An 8-inch water main that enters Area B at the intersection of Rosemont Avenue and Rocky Springs Road provides potable water to these facilities. A temporary water line bisecting the middle of Area B provides water service to the Area B remediation project to the west of Area B (Roszell, pers. comm., 26 March 2004).

4.9.2 Sanitary Sewer and Wastewater

All of the wastewater generated within Area A is discharged to the sanitary sewer system and pumped to the Fort Detrick Wastewater Treatment Plant (WWTP) in Area C. The WWTP operates at 40 to 50 percent of its capacity of 2.0 mgd as of 2002 (USAG Fort Detrick, 2003a). The annual average daily flow was 0.734 mgd in 2002, with a maximum of 1.347 mgd (USAG Fort Detrick, 2003d). The wastewater is treated and then discharged into the Monocacy River at a point downstream from both the Fort Detrick and the City of Frederick water treatment plants. This discharge is subject to Permit MD0020877, issued by MDE under the National Pollutant Discharge Elimination System (NPDES). The current permit was valid through 31 August 2003 (USAG Fort Detrick, 2003a). The application for renewal of the NPDES permit is currently pending.

The Flair Army Reserve Center and Landfill leachate collection system are connected to the Fort Detrick WWTP. A sewer main enters Area B at the intersection of Rosemont Avenue and Rocky Springs Road to provide the conveyance of wastewater from the above listed facilities. USAMRIID LARF and AFMESA are not connected to the wastewater collection system. USAMRIID facilities, Buildings 1221 and 1259, convey domestic and non-domestic wastewater into a septic system and associated drain fields. Building 1259, the washdown pen, has a separate holding tank. Liquids from the holding tank are sprayed on the agriculture fields for disposal and nutrients. The AFMESA facility pumps wastewater into a holding tank that is pumped out on a regular basis. Currently, the west section of Area B is not connected to the Fort Detrick sewer system (Roszell, pers. comm., 3/26/04).

4.9.3 Energy

The Potomac Edison Power Company (a subsidiary of The Allegheny Power Company) provides electrical power to the installation via two 35-kilovolt (kV) power lines. The demand for electricity at the installation is high due to the energy-intensive nature of research activities conducted at Fort Detrick. The total electrical power consumption for the entire installation in fiscal year 2002 was 139,323,476 kilowatt hours (kWh) (USAG Fort Detrick, 2003a).

Power to Area B is supplied by a 100 amp overhead line from Area A. This power supply line, installed over 40 years ago, crosses Rosemont Avenue and enters Area B in the southeast corner of the property. This power supply line to Area B is nearing capacity (Schmidt, pers. comm, 3/29/04). If the transformers located on Area B were loaded to full capacity the main power line from Area A would be inadequate. For example, if the AFMESA facility transformer alone was loaded to full capacity it would require 70 amps or 70 percent of the total capacity from main electrical distribution line from Area A.

The Frederick Gas Company furnishes natural gas to Fort Detrick. Natural gas consumption for the entire Installation in fiscal year 2002 was 5,655,120 hundreds of cubic feet (ccf). An annual average of 83 percent of the natural gas provided to the post is used by the boiler plant and the incinerators (USAG Fort Detrick, 2003a).

A major energy consumer at Fort Detrick is the central heating plant, which consists of five boilers, a steam distribution system, and a steam sterilization system. The central heating plant utilizes both natural gas and No. 6 fuel oil to generate steam, which is used for heating and as process steam. The total amount of steam used for the entire Installation in FY2002 was 559,912,000 pounds (USAG Fort Detrick, 2003a).

4.9.4 Solid Waste

Solid waste at Fort Detrick is collected and disposed of in the Fort Detrick landfill. This landfill, located in Area B, is permitted to operate by the State of Maryland under Refuse Disposal Permit Number 2000-WMF-0327-0. The permit, issued on 5 May 2000, will expire on 4 May 2005. The permitted area for the landfill consists of a 60.9-acre fill area located in the northwest corner of Area B. This landfill is permitted to accept the following types of waste generated only at Fort Detrick: domestic, municipal, commercial, industrial, agricultural, silvicultural, construction, and other community sources. Types of waste that are not permitted for disposal at the Fort Detrick landfill include: controlled hazardous substances, liquid waste, special medical waste, radioactive materials, automobiles, large containers such as drums or tanks (unless flattened or crushed and empty of contents), animal carcasses, untreated sewage, and truckloads of separately collected yard waste and tires, unless otherwise specifically authorized by a valid permit issued under COMAR.

The landfill is constructed in compliance with the issued permit with compacted cell floors, synthetic geomembrane liners, and a leachate collection system. Groundwater monitoring wells are installed for leak detection and the leachate collection system routes leachate to the sanitary sewer system. A cover of six inches of compacted earth is placed over exposed solid waste daily to prevent odor and particulate emissions, and to minimize infiltration of rainwater into active cells. Intermediate and final covers over completed lifts are installed to depths of one-foot and two-feet, respectively. The disposal site is graded to minimize runoff, prevent erosion and ponding, and to drain surface water from the landfill area (MDE, 2000).

Additionally, in conformance with the permit to operate the Fort Detrick landfill, a leachate collection system has been installed to collect waste liquids for treatment at the Fort Detrick WWTP. Leachate volumes and local rainfall amounts are reported monthly to the Solid Waste Division of the MDE. Leachate consists predominantly of groundwater that has percolated through the landfill cover. All collected landfill leachate is routed to the Fort Detrick WWTP.

At the end of calendar year 2001, the remaining landfill capacity reported to the MDE was 1,380,218 cubic yards (cu. yd.). From FY 1997-2001 the Fort Detrick landfill accepted 23,911 cu. yd. of material. The estimated average annual rate of waste disposal based on this five-year average is approximately 4,782 cu. yd., which includes refuse, fill, and cover material. Using this rate as an indication of future activity the Fort Detrick landfill active cell has 155,549 cu. yd. of remaining capacity and will reach its maximum permitted load in 2093. The entire landfill has approximately 288 years left before it will reach its permitted capacity (USAG Fort Detrick, 2003a).

Fort Detrick also has an incinerator complex, which consists of two municipal waste incinerators and two medical waste incinerators. Fort Detrick is permitted to operate the municipal waste incinerators and the medical waste incinerators under Permit No. 10-000131 (USAG, 2003d). Residential, mixed residential and commercial, commercial, and special medical waste are all types of waste that are permitted for incineration at Fort Detrick. The incinerators can only accept municipal and medical waste from Fort Detrick. The municipal waste incinerators have the capacity to burn 2,000 pounds per hour (lbs/hr) and the medical waste incinerators are able to burn 1,000 lbs/hr. The incinerators can burn over 14,000 tons of waste per year, and are

currently operating at 21 percent capacity. The municipal waste incinerated consists of approximately 40 percent animal bedding, 10 to 15 percent plastics, 30 percent office waste, and 5 to 10 percent wood waste. In 2001, a total of 2,273 tons of municipal waste was incinerated at Fort Detrick (USAG, 2003d).

Fort Detrick operates a recycling center. Recycling is mandatory for those who live and work at Fort Detrick. A variety of materials at Fort Detrick are recycled. Recycled materials include newspaper, white paper, cardboard, glass, aluminum cans, steel cans, and various scrap metals. In 2002, Fort Detrick recycled 990 tons of material.

4.10 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

Area B of Fort Detrick is located in Census Tract 7512. For purposes of this assessment, Tract 7512 and neighboring tracts (7505.01, 7507, 7526, 7527, and 7513) were evaluated to identify socioeconomic trends and relationships between Area B of Fort Detrick, the communities adjacent to the installation, and Frederick County as a whole (Figure 4-11).

4.10.1 Demographics

Census Tracts 7512, 7505.01, 7507, 7526, and 7527 experienced population increases ranging from approximately three to 30 percent between 1990 and 2000. This growth is expected to continue and the county population is projected to be more than 238,000 by the year 2010 and 282,100 by 2020 (USAG Fort Detrick, 2003a). Only Tract 7513 experienced a decline in population, which was less than one percent. During this same time period, Frederick County as a whole was experiencing rapid growth, with the population increasing approximately 30 percent (US Census, 2000).

The racial composition for Frederick County is primarily White, comprising 89 percent of the population. The racial composition of the remaining population is approximately 6 percent African American, 2 percent Asian, and 1.5 percent Two or More Races, as classified by the US Census. The remaining population is classified under the categories Native Hawaiian and Other Pacific Islander, American Indian, and Some Other Race (Table 4-3). In comparison to the county, Tract 7512, location of the proposed project, has the following racial composition: approximately 89 percent White, 5 percent African American, 4 percent Asian, and 2 percent Two or More Races. The remaining population of Tract 7512 is classified under American Indian, Native Hawaiian and Other Pacific Islander, and Some Other Race categories. These categories each comprise less than one percent of the population (Table 4-3). The racial composition of Tract 7512 is similar to that of the surrounding tracts with Tracts 7505.01 and 7505 having a slightly greater minority population and the remaining tracts having a minority population of 3 percent or less.

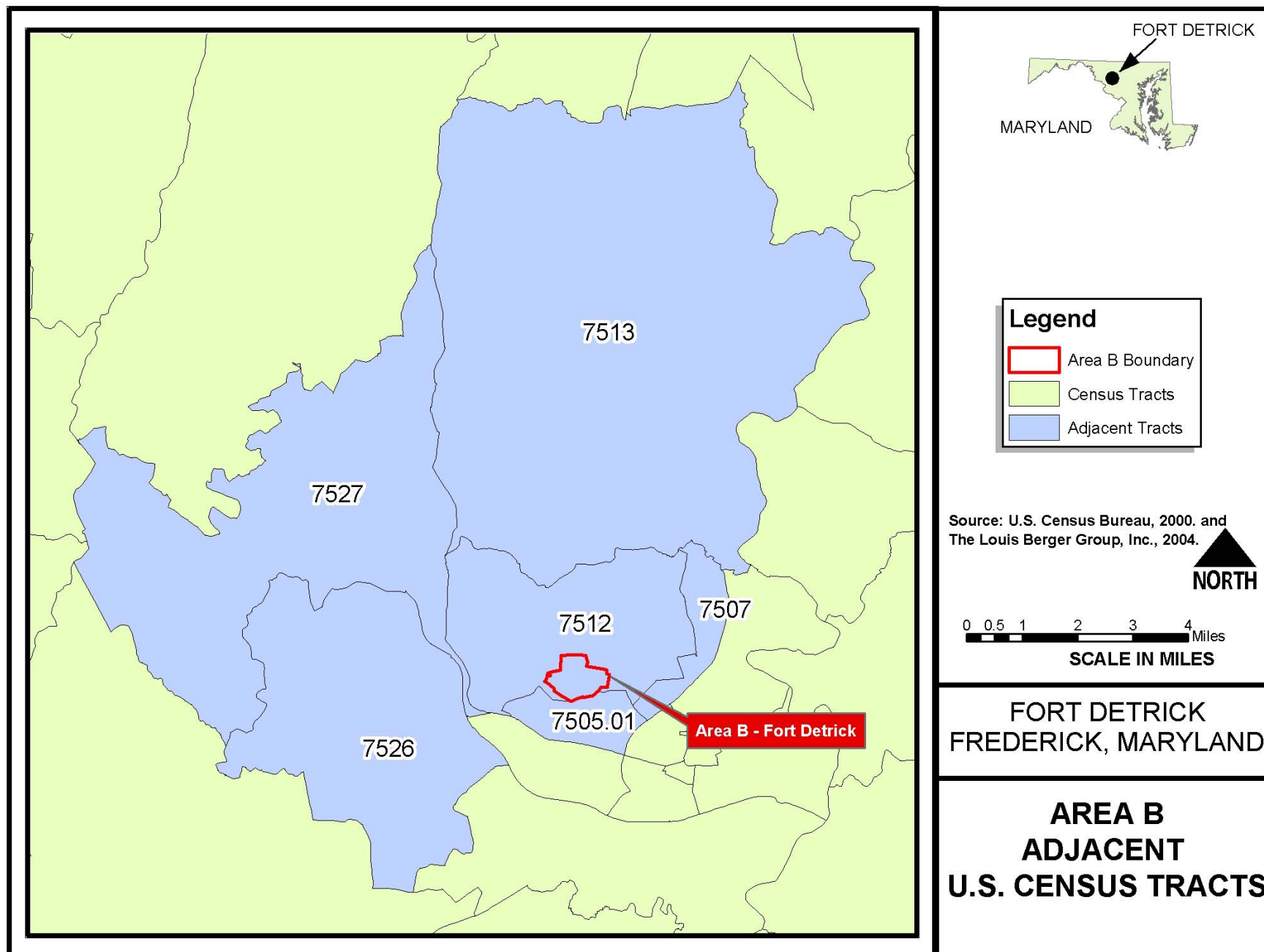


FIGURE 4-11 – ADJACENT U.S. CENSUS TRACTS

TABLE 4-3 – POPULATION AND RACE

Characteristics		Frederick County	Census Tracts					
			7512 (Fort Detrick)	7505.01	7507	7513	7526	7527
1990 Population		150,208	5,213	7,077	6,838	5,784	7,905	3,438
2000 Population		195,277	9,576	9,184	7,704	5,774	8,506	3,548
Population % Change 1990-2000		30%	84%	30%	13%	-1%	8%	3%
Race (2000)	White	174,432	8,484	6,299	6,009	5,605	8,232	3,478
	African American	12,429	510	1,563	1,027	57	94	15
	American Indian	404	28	47	24	8	3	4
	Asian	3,269	339	424	290	41	66	9
	Nat. Hawaiian/ Other Pac. Islander	61	5	9	7	0	1	1
	Some Other Race	1,806	66	553	151	20	23	14
	Two or More Races	2,876	144	289	196	43	87	27
	Hispanic	4,664	276	896	340	46	112	33

Source: US Census, 2000.

4.10.2 Economics

As shown in Table 4-4, the unemployment rate for all six tracts ranged from approximately one to five percent. In 2000, the US Census reported an unemployment rate of approximately 1 percent for Frederick County, a rate consistent with the project area and the surrounding communities.

In 1999, the county-wide median household income for Frederick County was approximately \$60,276. During this same time, the median household income of Tract 7512, the location of Fort Detrick, was approximately 17 percent higher than the county median income. The surrounding tracts all had similar median household incomes, with two of the tracts having incomes below the county median and three having incomes above (Table 4-5).

The most recent data on poverty statistics provided by the US Census are 1999 projections conducted in 2000. These data show that approximately four percent of the population in Frederick County was below the poverty level (Table 4-5). Area B of Fort Detrick (Tract 7512)

and the majority of surrounding tracts had poverty rates ranging from one percent to 9 percent (US Census, 2004).

TABLE 4-4 – LABOR FORCE AND UNEMPLOYMENT - 2000

Characteristics (1990)	Frederick County	Census Tracts					
		7512 (Fort Detrick)	7505.01	7507	7513	7526	7527
Labor Force	133,180	5,043	5,546	4,233	3,414	4,748	2,046
Unemployed	1,495	98	291	209	51	98	44
Unemployment Rate	1%	2%	5%	5%	1%	2%	2%

Source: U.S. Census, 2000.

TABLE 4-5 – INCOME AND POVERTY - 1999

Characteristics	Frederick County	Census Tracts					
		7512 (Fort Detrick)	7505.01	7507	7513	7526	7527
Median Household Income – 1999	\$60,276	\$70,256	\$42,574	\$51,044	\$66,031	\$71,038	\$75,166
Per Capita Income – 1999	\$25,404	\$27,450	\$21,380	\$22,161	\$31,459	\$29,344	\$28,628
% Below Poverty Level – 1999	4%	2%	9%	6%	2%	2%	1%

Source: U.S. Census, 2000 (data is projected from 2000 US Census Data).

4.10.3 Environmental Justice

On 11 February 1994, President Clinton issued EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations.

As defined by the “Environmental Justice Guidance Under NEPA,” “minority populations” includes persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, black (not of Hispanic origin), or Hispanic. Race refers to Census respondents’ self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American.

A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. Low-income populations are identified using the Census Bureau's statistical poverty threshold, which is based on income and family size. The Census Bureau defines a "poverty area" as a census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level.

Approximately 11 percent of the residents in Tract 7512 are classified as minorities according to the CEQ's Environmental Justice guidance. Tracts 7505.01, 7507, 7513, 7526, and 7527 are comprised of 31 percent, 22 percent, 3 percent, 3 percent, and 2 percent minority residents, respectively. When considering income levels with respect to Environmental Justice, two percent of the residents in Tract 7512 are below the poverty level. The surrounding tracts have similar levels: Tract 7513 and Tract 7526 have 2 percent of the population below the poverty level and Tract 7527 has one percent of the population below poverty level. Tracts 7505.01 and 7505 have slightly higher levels, with 9 percent and 6 percent of the population living below the poverty level, respectfully. Therefore, the tracts surrounding Area B, including the City of Frederick, are not considered a low-income community under EO 12898.

4.10.4 Children's Safety

EO 13045, Protection of Children from Environmental Health and Safety Risk, requires federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. This EO, dated 21 April 1997, further requires federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. EO 13045 defines environmental health and safety risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on and the products we use or are exposed to)."

There are 191 existing family housing units on the installation at Fort Detrick. All the housing units are located within Area A and may include children under the age of 18. According to the 2000 U.S. Census, there are 2,589 people living in Tract 7512 that are under the age of 18, comprising approximately 27 percent of the tract's population (U.S. Census, 2000).

4.11 NOISE

Noise is any unwanted sound that can interfere with hearing, concentration, or sleep. The major sources of noise include transportation vehicles, heavy equipment, machinery, and appliances. The Noise Control Act of 1972, 42 USC 4901 et seq., was enacted to establish noise control standards and to regulate noise emissions from commercial products such as transportation and construction equipment. The Noise Control Act exempts noise from military weapons or equipment designated for combat use.

The standard measurement unit of noise is the decibel (dB), which represents the acoustical energy present and is an indication of the loudness or intensity of the noise. Noise levels are measured in A-weighted decibels (dBA), a logarithmic scale which approaches the sensitivity of

the human ear across the frequency spectrum. Therefore, the dBA accounts for the varying sensitivity of the human ear by measuring sound the way a human ear would perceive it. The dBA measurement is used to indicate damage to hearing based on noise levels, and is the basis for federal noise standards. A 3-dB increase is equivalent to doubling the sound pressure level, but is barely perceptible to the human ear, but a 5-dB change in sound is very noticeable, and a 10-dB change in sound almost doubles the loudness. Table 4-6 illustrates common noise levels.

Both COMAR (26.02.03.03) and the City of Frederick Ordinance G-02-9 set maximum allowable noise levels for residential land use at 65 dBA during daytime and 55 dBA during nighttime hours. The day-night average sound level set forth in COMAR for residential property is 55 dBA. The day-night average sound level is defined as the average sound level for a 24-hour day with a 10 decibel penalty applied to noise occurring during the nighttime; i.e., noise levels occurring during the period from 10 pm until 7 am are treated as though they were 10 dBA higher than they actually are. This measurement is used to determine acceptable noise levels and is endorsed by agencies such as the USEPA, the Federal Highway Administration (FHWA), the Federal Aviation Administration (FAA), the U.S. Department of Housing and Urban Development (HUD), OSHA, and the DoD.

The FHWA has established noise abatement criteria for roadways. An exterior L_{eq} of 67 dBA is the standard typically used to evaluate noise levels, measured 50 feet (15 meters) from the centerline of travel. The L_{eq} represents the equivalent sound pressure level or the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring. The USEPA determined that a 24-hour L_{eq} limit of 70 dBA (both indoors and outdoors) would protect against hearing damage in commercial and industrial areas. Workplace noise standards set by OSHA are measured in two ways. A standard of 90 dBA for an 8-hour duration is the limit for constant noise and a maximum sound level for impulse noise is 140 dBA. Impulse noise is any sort of short blast, such as a gunshot. The Department of the Army has set a noise standard of 65 to 75 dBA, depending on the location, for transportation related noise (AR 200-1). A significant impact is considered to occur if noise levels exceed Army, USEPA, or OSHA noise standards.

The primary sources of noise at Fort Detrick are the boiler plant, the generator facilities in Building 1673 and 1677, vehicular traffic, the carpenter shop in Building 199, and bugle and cannon exercise at 5:00 pm Monday through Friday; however, these sources of noise are considered minor. In general, Fort Detrick is considered a relatively quiet environment with no significant noise pollution sources on the installation. Fort Detrick conducts periodic surveys to identify operations that expose workers to potentially harmful noise levels and employees who work in areas with potentially harmful noise levels are enrolled in the Army's Hearing Conservation Program. Based on measurements of noise performed on the Installation, the noise generated from operations is compatible with residential use.

TABLE 4-6 – COMMON NOISE LEVELS

Source	Decibel Level (dBA)	Exposure Concern
Soft Whisper	30	Normal safe levels
Quiet Office	40	Normal safe levels
Average Home	50	Normal safe levels
Conversational Speech	65	Normal safe levels
Highway Traffic	75	May affect hearing in some individuals depending. on sensitivity, exposure length, etc.
Noisy Restaurant	80	May affect hearing in some individuals depending. on sensitivity, exposure length, etc.
Average Factory	80-90	May affect hearing in some individuals depending. on sensitivity, exposure length, etc.
Pneumatic Drill	100	May affect hearing in some individuals depending. on sensitivity, exposure length, etc.
Automobile Horn	120	May affect hearing in some individuals depending. on sensitivity, exposure length, etc.
Jet Plane	140	Noises at or over 140 dB may cause pain
Gunshot Blast	140	Noises at or over 140 dB may cause pain

Source: EPA Pamphlet, "Noise and Your Hearing," 1986.

A noise analysis was conducted in 1999 to determine noise impacts associated with the operation of the former outdoor skeet and trap shooting range on Area B. Ambient noise levels were recorded during this study to determine normal noise levels during times when the outdoor range did not operate. Nine monitoring stations were set up inside and along the perimeter of Area B. The average ambient noise level for Area B and its surroundings, using the recordings from the nine monitoring stations, was 49.6 dBA. Primary sources of noise for Area B were traffic from surrounding local roads (e.g., Kemp Road), aircraft overflight, birds, and wind. Residential development within the surrounding communities of Area B has increased; however, the ambient noise levels recorded in 1999 are expected to be similar to existing noise levels around Area B.